

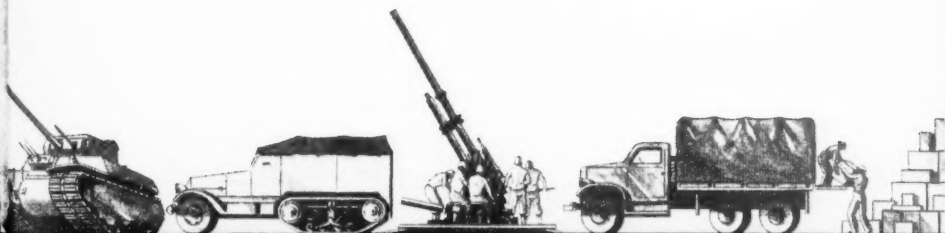
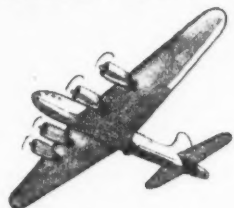
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COMMAND AND GENERAL STAFF SCHOOL

FORT LEAVENWORTH, KANSAS

A MONTHLY REVIEW OF MILITARY LITERATURE

MILITARY REVIEW

ENGLISH EDITION

Starting with the April 1945 issue, the Command and General Staff School broadened its scope by publishing the MILITARY REVIEW in three languages, namely English, Spanish, and Portuguese.

The articles that appear in the Spanish-American and in the Brazilian editions will be found that same month in the English edition.

This notice is to acquaint our readers with the fact and to insure our Spanish-American and Brazilian neighbors that it will be our most sincere endeavor to translate the English text faithfully, and to produce, to the best of our ability, a magazine that is authoritative, informative, interesting and instructive.

The Editors

EDICION HISPANOAMERICANA

Con el número del mes de abril de 1945, la Escuela de Comando y Estado Mayor amplió sus actividades con la publicación de la MILITARY REVIEW en tres idiomas: español, portugués e inglés.

Los artículos que se publican en las ediciones hispanoamericana y brasileña aparecerán en la edición norteamericana del mismo mes.

Por medio de estas líneas, deseamos hacérselo saber a nuestros lectores y, asegurarles a nuestros vecinos de Hispanoamérica y del Brasil, que dedicaremos nuestro más sincero esfuerzo a traducir con exactitud la versión inglesa y a presentar, de acuerdo con los medios a nuestro alcance, una revista autoritativa, informativa, interesante e instructiva.

La Redacción

EDIÇÃO BRASILEIRA

Com o número do mês de Abril de 1945, a Escola de Comando e Estado Maior estendeu seus horizontes com a publicação da MILITARY REVIEW em três idiomas, o português, o espanhol e o inglês.

Os artigos publicados nas edições brasileira e hispano-americana aparecerão também na edição em inglês do mesmo mês.

Este aviso tem em vista dar conhecimento deste fato aos nossos leitores e assegurar aos nossos vizinhos brasileiros e hispano-americanos que serão envidados sinceros esforços na tradução do inglês, para apresentar-lhes com os meios ao nosso alcance, uma revista fidedigna, informativa, interessante e instrutiva.

A Redação

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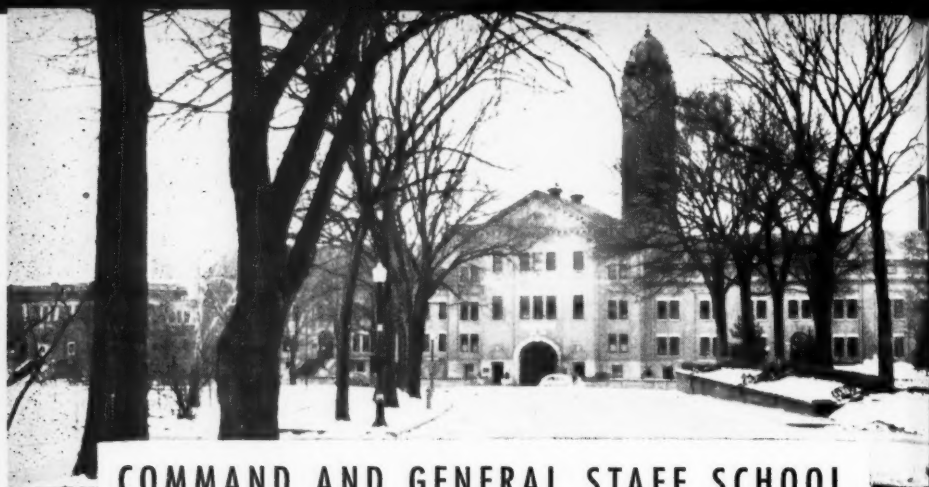
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Air Power

BRIGADIER GENERAL R. C. CANDEE

Director, Air Force Instruction, Command and General Staff School

AIR power is something new under the sun. The short space of thirty-seven years, during which the United States has had military airplanes, is a brief period as compared with the fifty or sixty centuries of recorded history and the numberless ages of prehistoric life upon this earth throughout which men and nations have fought each other. And yet in this short span of but a single human generation there has arisen a new military force whose blows are measured in millions of tons of high explosives shattering whole industries and destroying strong military forces and whose machines, flying with almost the speed of sound, find their targets through the obscurity of clouds and darkness which heretofore have greatly reduced or entirely halted the operations of war.

We have lived so close to the growth and development of air power in the present war that we have come to take it for granted. For those who have not been players on the current fields of battle the press, the radio, and the screen have reproduced the perceptions and reactions of combat most vividly. But most persons are so engrossed in the small individual tasks assigned them that they have little time to study air power as one of the few dominating figures in this vast panorama of World War II. In the brief space of this article an attempt will be made to present some pertinent but general points in regard to the source, capabilities, organization, and employment of air power that may have escaped the layman.

In discussing any new or important subject it is advisable to define the principal terms involved. Unfortunately this is not easy in the case of air power. This is due not only to the fact that air power is an abstract concept but also to the fact that it is constantly growing and changing with the development of aeronautics and new inventions in all fields of physical science. Although the concept of sea power is much older than that of air power, the continuing stream of books that are still being written on sea

power testifies to the difficulty of defining that term. Nevertheless, in order to have a peg on which to hang this discussion, the following short definition of air power is offered: "Air power includes everything that contributes to a nation's strength in the air or through the medium of aircraft." From this definition it is seen that an almost infinite variety of both tangible and intangible factors are included in the concept.

In addition to organized military air forces, through which it is applied in time of war, a nation's air power includes its industrial capacity for the production of aeronautical matériel and accessory equipment. It includes the basic manpower and the technical skill required for this industrial production. It includes the air, highway, rail, and water shipping that transports the raw materials and finished products. Civil aviation, airlines, private flying, airports and bases for both, are all a part of air power. The location of bases, military or civil, from which air operations are conducted, the location and distribution of aircraft and munitions factories, of oil refineries, training establishments, and depots are also air power factors. Geography, climate, and the political, economic, and psychological attributes of the people contribute to a nation's strength in the air. Even the other organized military forces—armies and fleets—affect and contribute to the strength of a nation in the air. Thus, it is seen that military air forces alone are but a small, though none the less essential, part of this larger concept of air power.

But air power cannot assert exclusive claim to the various national resources and attributes that I have just mentioned. Many of them are also elements in the land power and sea power of a nation. What then, one might ask, are the grounds for thinking there is such a thing as air power—distinct from the older forms of military strength? Why do some people and some nations see in the airplane the basis for a new and separate kind of warfare—coordinate in concept and

equal in standing with the older forms of land and sea operations? The reasons are found in the fundamental differences between air, land, and sea forces; between the airplane, the naval vessel, and the basic equipment of combat and locomotion of the ground forces; and in the essential differences between the elements or environments in which they move. It was neither accident nor caprice that brought about through the centuries the separate development of fleets and armies; rather it was the inherent physical differences in their surroundings and the necessity for using different weapons and vehicles and different techniques and skill. Men who follow the profession of arms, ashore and afloat, inevitably create specialized matériel, methods, and organizations to fit the peculiar requirements of their operations and surroundings. This has resulted in fundamental differences between land and sea forces. The shoreline marks as clear a division between these two forces as it does between the elements on which they fight. In the same way, man's new ability to fly provides the basis of a new kind of military organization—different from either armies or fleets. Aircrafts are sustained by air, naval craft float in the water, and ground units operate firmly upon the solid earth. To this condition, among others, is traceable the fact that combatant air, sea, and land forces are as fundamentally different from each other as are the gases, liquids, and solids which support them.

Since the distinctive nature of its organized combatant forces is the chief feature distinguishing air power from land and sea power, it is to military air forces that we must look for an understanding of the capabilities, limitations, and organization of air power, and its adaptation to war. And while considering what can and cannot be done by air power in the broad sense, and by the organized combatant air forces through which air power is made manifest in war, it is well to bear in mind the distinction between these two terms, "air power" and "air forces," that are so often confused in popular usage.

The capabilities and limitations of air

power have been matters of speculation and controversy since the first flight of the Wright brothers in 1903. It was but natural during the early years of aviation that men should have held widely differing views concerning its future. They had had no actual experience with air warfare on which to base informed or expert opinion. Their views could but reflect the measure of their imagination or emotion. The first World War, 1914 to 1918, was inconclusive, and served only to confirm most people in their previous beliefs or prejudices regarding the importance of air power as a factor in war. Nevertheless, our enemies—Germany, Italy, and Japan—had the foresight to build, and the skill to employ, air power and air forces so as to acquire tremendous advantage in the early stages of the present conflict.

German air power—real or suspected—was sufficient to compel Britain to try to appease Hitler at Munich in 1938. German air power—real or suspected—was a weighty factor in bringing about the Soviet-German Non-Aggression Treaty in 1939. Italian air power—more apparent than real—was an effective threat for years in the Mediterranean area, in both diplomatic and military spheres, until its actual strength was discovered and destroyed. The failure of Germany's Luftwaffe, in combination with her land and sea forces, to win decisive victory over England in 1940 was due not so much to the actual or potential might or weakness of German air power as it was to Nazi miscalculation of the defensive strength of the Royal Air Force and the rugged character of the British people. Japanese air power—much stronger in fact than in the calculations of our military men prior to December 1941—dealt us a staggering blow in opening the long-predicted war in the Pacific. Paradoxically, in her shattering air attack at Pearl Harbor, Japan sealed her own doom by awakening the United States from its twenty-year-long self-induced military slumber.

The precise capabilities of air power cannot be measured with accuracy. Too many variable and intangible factors are involved,

and what lies beyond the horizon of aeronautical development is also beyond imagination. But the concrete achievements of air forces have been vividly and convincingly proven during the past five long war years. The German Air Force destroyed the weaker Polish aviation immediately after war started in September 1939. Invasion troops, carried to Norway and Holland by the Luftwaffe, destroyed within a few hours the keystones of defense of those unhappy countries. German aviation gave indispensable support to the panzer forces that crushed French resistance in a matter of days, and led to the disaster of Dunkerque. Nazi air fleets blasted English cities and threatened Britain's island defenses as they had not been threatened for a thousand years, until her hope, if not her courage and determination, were all but lost. German long-range aircraft cruised the North Atlantic routes as well as the narrow seas to stalk the victims of the Nazi submarines. Japanese aircraft sank the proud British capital ships—Prince of Wales and Repulse—and in crippling our pre-war Navy, radically modified our whole Pacific plan.

These and many other staggering blows of Axis air forces brought anguish to the hearts of Allied nations that had failed to heed the warnings of the prophets of air power. But with prodigious resolution, energy, and genius, we set about developing the potential strength of our aviation and related industries which the Nazis had belittled as we had underrated the degree of their preparedness and the enormity of their evil purposes. Not soon, but at long last, the tide of war turned in the Allies' favor and our air power performed miracles in the supply and operation of our air forces. Fighter aircraft were shipped and flown from America in ever-increasing numbers to bolster the dwindling defenses of England, Egypt, and Russia. Allied bombers began to strike damaging blows against our enemies in Europe, Africa, and the Pacific. Army bombers joined with Navy carrier-based planes and the RAF to seek and sink the U-boats that were starving the British Isles.

Merchant vessels hastily converted, and new aircraft carriers built with incredible speed, guarded our vital convoys across the oceans. Air transport planes carried ammunition in forty-eight hours from the United States to Egypt to tip the scales in favor of Britain's desperate defense against the Nazi's farthest drive toward the vital Suez Canal and the oil of the Near East. And finally, in this defensive period of our operations, American Army and Navy aircraft, land-based and carrier-born, turned back Japan's offensive fleets at Midway and the Solomon Islands, stopping the enemy's thrust against our lifeline to the Southwest Pacific.

Lack of space prevents listing all the kinds of action and achievements of air power after we assumed the strategic offensive in various theaters of operations. It is enough to point out that we blasted Germany from the air and our bombers struck far beyond the range of the weapons of our surface forces to attack the sources of Nazi military power—aircraft, weapons, and vehicle factories, and oil, ball bearing, steel, and rubber industries, and electric power and transportation systems. Allied forces prepared the way and joined in the assault on Fortress Europe by Allied ground and naval forces in the greatest amphibious attack of all time. Our troop carriers transported airborne divisions over greater distances and with more precision and effectiveness than were ever achieved by the ingenious Germans. On the other side of the world, air, land, and sea forces combined to isolate and kill the Japs in island after island and base after base until MacArthur once again stands firmly in the Philippines, and the remnants of the Nipponese Navy have been driven back on the doubtful protection of its weakened home defenses. Throughout all these offensive operations, Allied air forces provided increasing protection against Axis air attack on our surface forces. Air transport moved important staff and combat personnel and supplies in swelling volume to the combat theaters, and has been of incalculable importance in the evacuation of sick and wounded, thus boosting both the morale and

the combat strength of the fighting forces.

If emphasis has been placed on the capabilities and deeds of aviation, and the great growth and achievements of land and sea forces in this war have been neglected, it is only because the subject of this discussion is air power. Our comrades in the surface forces of the Army and Navy have borne their trials in battle with no less courage and tenacity than have the airmen, and land and sea forces have far exceeded all past military performance.

As to the limitations of air power, we have seen the inability of air forces to accomplish some of those tasks for which land and sea forces are especially organized and equipped. Just as only air forces can operate in the field of air combat and at ranges beyond the reach of either land and sea forces, so air units are inferior to the latter in many of the combat and service operations of surface forces, and are wholly incapable of carrying out some of the usual tasks of armies and fleets. Although all three forces—land, sea, and air—have produced results during this war which, by old standards, were believed impossible, the novelty as well as the importance of its operations has frequently turned the spotlight on air power. Its future possibilities are as limitless as the sky which is its field of operations. But our experience during the past five years provides no sound basis for a conclusion that strong enemies can be beaten by air action alone. The vast destruction of German industrial establishments by air bombing could not be fully appreciated until the collapse of Nazidom permitted inspection of the damage. But air power did not alone cause the complete stoppage of Nazi urban activities nor the complete collapse of German morale. It takes all available air power plus land and sea power for victory in modern war. In union there is strength, and the strength of each force—land, sea, and air—is multiplied when joined with the others in the fulfilment of a common plan.

Having considered the nature of air power and the capabilities of air forces, let us turn to the subject of their organization. By organ-

ization is meant the structure of authority and control within an aggregation of parts, and the interrelationship of those parts by which command and coordination are made easier and more effective throughout the whole group. Organic structure is determined chiefly by the purpose for which the organization exists and also by the equipment and techniques available for its use.

Before considering the internal organization of air forces, let us examine their relation to the older land and sea forces. Historically, air forces developed first within and as parts of the two older services. It has been widely accepted in the United States until the present war that the general functions of an army pertain to land operations and the general functions of a navy to sea operations. The range of weapons and the doctrine of employment of land and sea forces will always prevent the combat operations of either from overlapping far into the particular field of the other. The splitting of the responsibility and authority over aircraft and air operations between our Army and Navy was justifiable years ago when the small capabilities of aircraft limited the latter to minor support of their respective parent organizations. But however proper may have been the early apportioning of aviation between the two traditional services, the increase in the range and the destructive power of the airplane now provide the basis for a separate force. Not only are large air forces radically different in equipment and organization from land and sea forces, but their ability to attack the objectives of both armies and navies, and also to destroy targets far beyond the range of either, is sound additional reason for creating a strong national air component distinct from both the Army and the Navy.

The War Department has recognized the distinct nature and capabilities of air forces and within the Army has established them as a separate element coordinate with the Army Ground Forces and the Army Service Forces. No longer is aviation regarded as one of the ground arms or services. The War Department has gone even farther in its appreciation of the present status and future possibilities

of air power and has recommended to the Congress major and radical reorganization of our armed forces. This reorganization would create a simple Department of the Armed Forces to include three coordinate combatant services—the Army, the Navy, and the Air Forces—and a fourth component of equal importance, namely, a Service of Common Supplies.

Coordination of the strategy and tactics of armies and fleets fighting in a common theater of operations has always been a difficult problem. This problem has been vastly complicated by the addition of air forces which operate with equal ease over both land and sea areas, especially where command of these air forces is divided between the land and sea commanders. Solution of the problem in the field has been found by placing all forces—land, sea, and air—in one theater under the operational control of a single theater commander who is subordinate to neither the War or Navy Departments, but to a common superior—as regards the Pacific to the Joint Chiefs of Staff representing the President and in Europe to the Combined Chiefs of Staff. Immediate control of the Twentieth Air Force (B-29 Superfortresses), which operates from and within more than one theater, is retained by the Joint Chiefs of Staff themselves. The War Department's proposal would provide the same unity of command at the highest national military level during peacetime as is now found necessary in war, and the same unity of command in Washington as in the field.

Although land, sea, and air forces should be handled as distinct and coordinate elements at each level of command, it does not follow that each should plan and conduct its operations independently of the other. Quite the contrary is true. Their several operations should be coordinated through a common aim and a common plan. We find in military organization, just as in that of the non-military world—whether it be commerce, industry, education, or any other field of endeavor—that it is necessary, in order to develop the greatest technical efficiency in both personnel and equipment, to separate a large mass of

men and matériel into different groupings, each based on similarity of machines or techniques. This is administrative or technical organization. Then, for the most effective employment of this mass in one or more areas, all the various elements operating against any given objective in each area must be brought under a single commander. This is organization for a common mission or task. Only through the existence of a common aim and mutual cooperation under a single directing head can the greatest effectiveness be obtained from the various components of a large and complex organization.

Let us turn our attention now briefly to the internal organization of the air forces of the Army and the Navy. Suffice it to say here that naval air and surface forces are very closely interwoven within the fabric of naval organization and command. The momentous victories of our naval forces in the Western Pacific in recent months are proof of the effectiveness of such organization. In the Navy, aircraft have been kept as an integral part of the fleets and until this war were used principally in support of surface operations. However, naval task forces, built around the employment of aircraft carriers, have increased greatly in size and importance as compared with task forces of other kinds.

In the Army, on the other hand, full scope for the operations of air forces would be impossible were they tied to the ground armies or ground task forces in each theater. The functions of theater air forces include both the strategic operations far beyond the immediate operations of ground forces and the tactical air operations designed to help the armies within their battle areas. Hence we find the bulk of the Army air units organized into two major types of air command: strategic and tactical air forces. And as long as the enemy air force is capable of serious offensive bombing, an air defense command comprising day and night interceptor fighters is required in each theater. Two additional major commands, when the situation warrants, are the troop carrier units for airborne operations and coastal or antisubmarine forces for safeguarding coasts and shipping.

The structure of internal organization of air forces is constantly changing to meet the new situations that modern warfare incessantly produces.

The final topic in the broad subject of air power is that of the principles and manner of its employment. It was suggested earlier that the allotment of national sources among land, sea, and air forces is a matter of national policy. So, too, is the application of the principles of war to the manner of employing our national aviation. Only the nation as a whole, acting through national legislation supported by appropriations, can decide the objectives of our national air power. Shall it be used to coerce and destroy the weaker nations—as Germany used hers? Or shall it be used only for the defense of our national territory and that of our friends in this hemisphere? Shall we build our air forces strong enough to meet our enemies at any time—or shall we risk defeat by having to expand a token peacetime air establishment a hundredfold after the aggressor has struck a crippling blow? Shall we be prepared to lead with our fist or only with our chin? The first policy is expensive, but the latter may be fatal. Shall we concentrate our limited air strength in the United States, or distribute it throughout the world? If we adopt the latter course we must acquire bases in strategic areas. Shall we provide mobility for our air forces? Then we must maintain adequate service forces and a strong Merchant Marine. Shall we give heed to security, as we did when we built our largest aircraft factories in the interior of the country, or shall we court disaster by locating vital industries near the coasts where climatic conditions and the labor market are more pleasant? Shall we simplify our military structure and facilitate cooperation by giving legislative recognition to our air forces as coordinate with our land and sea forces, all under a single head, or shall we continue to divide the direction of our air power between the Army and the Navy, whose basic combat functions are divided by the coastline rather than being determined by the single purpose of defeating a common enemy? These are

questions of national policy which may well be pondered by citizens of our great democracy.

This war, the first great conflict in which air power has been a major factor, has weighed established principles of tactics, strategy, and organization and found them sound. Repeated or conspicuously successful air operations have also produced what appear to be principles applicable particularly to air warfare. Time and further test will establish the validity of these new principles. It would greatly simplify the work of making military decisions if we possessed fixed rules for the selection of air force objectives and targets. But in the long run such simple procedure would only play into the hands of an alert enemy. Each problem must be solved on its own factors. It is one thing to study and know the principles of our professions and a more difficult task to apply them with wisdom.

Air power provides a longer arm for striking military blows than has ever existed in the past. It bring within range enemy objectives of a kind never before attainable. It is no longer necessary to destroy or defeat hostile surface forces before striking directly at the heart or jugular vein of the enemy. This fact, in turn, makes higher headquarters retain direct control of long-range air forces. It is for this reason that not only the specific operations of small air forces are sometimes prescribed by theater commanders but that the planning of operations and the supervision and control of the Twentieth Air Force are kept in the hands of our Joint Chiefs of Staff in Washington. And the destruction, for instance, of production of petroleum products in Germany, being a matter which affected at its roots the ability of our Nazi enemy to conduct all aspects of his war against us, led even the highest Allied authorities themselves to specify plans for the strategic employment of Allied Air Forces in Europe.

The history of air power is short. Its future is obscure. But Kipling spoke with the voice of prophesy when he said of air power, "We are at the opening verse of the opening page of the chapter of endless possibilities."

Strategical Aspects of the Final Campaigns Against Germany

COLONEL CONRAD H. LANZA

ON 1 March 1945, three major offensives were under way against Germany, one each on the western, southern, and eastern fronts. The western Allies conducted the first two, under the direction of the Chiefs of Staffs Board in Washington. Russia conducted the third. There was liaison between the western Allies and Russia but there was no joint command. They worked separately, and with somewhat different strategic points of view.

The principal mission of the western Allies was to crush Germany. Their main force was on the western front. As near as can be ascertained from figures so far released, the Allies had, including French troops, nearly four millions of men, against an enemy who had about two millions. On the southern front, about 350,000 Germans faced at least half a million Allies.

Differences in numbers do not sufficiently indicate the real difference in strengths. In the air, the Allies had undisputed superiority. Their planes could go anywhere at any time. So superior was the air force over that of the enemy that our troops could march and maneuver by day, while the Germans were obliged to restrict all movements in the open.

The Allied troops were superbly equipped and had abundant motor transportation. The Germans had motor transportation, but most of it was non-operating. This had been gradually brought about by constant air bombing of German plants and utilities. Germany had built a certain number of underground manufacturing establishments. Their capacity had been based upon expected losses from night bombing by the British Royal Air Force. No allowance had been made for day bombing which came later from the American Eighth and Fifteenth Air Forces. This was more accurate, and vastly more destructive, than night bombing. Under these air assaults, German production declined, and by March it was at a low level.

Due to lack of motor transportation, German units had but limited maneuvering capacity. Some units appear to have had almost none. The Germans were prepared to defend positions. On all three fronts, as soon as their front line was either pierced or broken, German resistance rapidly vanished. In no sector did the Germans have troops in reserve who had transportation to enable them to concentrate against penetrations.

In this situation, each of the three fronts when broken through rapidly fell apart. It was impracticable to establish a new front in rear, as troops could not, on foot or with animal-drawn transportation, fall back as quickly as hostile forces with motor transportation could advance deeper into German rear areas. Neither was it found possible to hold cities and other likely places as centers of resistance or road blocks, except in isolated cases. And in none of the isolated cases where German troops were able to hold did this have any material effect on the final result. Motor transportation was always able to avoid particular areas by detouring around them, with only minor inconvenience.

On the Russian front, the German strength appears to have approached two millions. The Russian strength is unknown. It was certainly largely superior and, like the western Allies, had superior equipment.

On both the western and the eastern fronts, Allied and Russian maneuvering was facilitated by magnificent roads, and in the northern half of the fronts, by generally open and flat terrain over which motor transportation could operate. German efforts to delay advances of the Allies by destroying bridges had little success. The increasingly large number of amphibious vehicles in the military services make them much less dependent upon bridges than in preceding wars. Even wide rivers have not been serious obstacles.

THE PRELIMINARY OPERATIONS BY THE WESTERN ALLIES

During the first half of March, operations were on a limited scale, directed towards ousting the German forces west of the Rhine River. While the Germans made counterattacks from time to time, they continued to fall back slowly and undertook no large-scale counteroffensives. From the Allied point of view, deep penetrations were not practicable in view of the terrain, which was blocked by wide rivers only a short distance in rear of the German front.

In this fighting the Germans did fairly well, and were able to withdraw the greater part of their troops to in rear of the Rhine without undergoing excessive losses. There was one event unexpected by both sides. On 7 March the Allies captured a bridge intact across the Rhine near Remagen. Local commanders, appreciating the importance of this event, dashed across, and a bridgehead east of the Rhine was established. If the Germans had had good motor transportation, reserves might have been brought up to restore their position. But they had no mobile reserves immediately available. They were unable to concentrate as rapidly as the Allies, and were unable to prevent the bridgehead from being daily expanded.

By 15 March the Allies controlled the entire west bank of the Rhine and were ready for the final attack.

THE SITUATION ON THE EASTERN FRONT DURING MARCH

Just as the Allies on the west closed on the Rhine River, the Russian armies closed on the line of the Oder and Neisse Rivers between the Baltic Sea and the mountains of Bohemia. This was a very good line for an offensive towards the west. But whereas the western Allies were ready to attack across the Rhine by mid-March, the Russians were not ready.

South of the border between Germany and Bohemia, the Germans had been able to hold a Russian offensive headed southwest from upper Silesia and westward through Slovakia. They themselves undertook what be-

came their final offensive of the war. This was south and west of the Danube in western Hungary, and employed a panzer army with eleven armored divisions. It had some initial success, but failed to reach Budapest. It did draw off Russian troops from other sectors. Whether this was a material reason why the Russians did not attack across the Oder at the same time that the western Allies attacked across the Rhine is not yet known.

OPERATIONS OF THE WESTERN ALLIES FROM 16 MARCH TO 15 APRIL

The initial operation was the crossing of the Rhine north from Cologne on 23 March. Due to the known superior power of the Allied artillery and air forces, the Germans elected not to defend the river bank, but made their first stand several miles inland. An Allied innovation was the use of naval contingents to operate motor launches across the river. Amphibious vehicles crossed by their own power, and the whole operation was aided by dropping parachute troops in rear of the enemy. By these combined means, bridgeheads were quickly secured, but thereafter it took several days to break through the main German line of resistance. It was not until 1 April that the line was definitely pierced and armor had passed through to north and then east of the Ruhr.

In the meantime, the Remagen bridgehead had been undergoing daily enlargement. At the end of March, armor there broke through and on 1 April linked with that coming around from the north side of the Ruhr by advancing around the south side. On 29 March the Allied right attacked across the Rhine near the Mainz-Mannheim area, and it also broke through.

By 3 April the Allies were not only across the Rhine in strength but armored divisions in north, center, and south were through the German front, and were not only ahead of their own troops but in rear of the main German armies.

So far as now reported, the Allies had about twenty armored divisions in line abreast over a 300-mile front. They were nearly evenly distributed on a basis of one armored



division to each fifteen miles of front. They circled around defended centers and isolated and separated slow-moving, or non-moving, German units. These were usually taken care of by following infantry divisions, each of which was equipped with considerable motor transportation and could make substantial daily marches. In some cases it was considered advisable to supplement the infantry with tank units to reduce defended cities more rapidly. The German front under these blows just disintegrated. Their supplies were cut off. They were bombed mercilessly. They were separated from each other. They were unable to maneuver. No matter what position they elected to defend, the Allies could concentrate a superior force in less time than the Germans. Not one position was able to hold for long, although many were bravely defended.

With not too much fighting, Allied armor reached the banks of the Elbe River by 11 April in the vicinity of Magdeburg. This was an advance—in an air line—of 200 miles in twenty days, or ten miles a day including the breakthrough period. Excluding the breakthrough period, in the last eight days 150 miles had been made, or nearly twenty miles a day. Maximum advance on any one day was fifty miles.

The western Allies had previously agreed with Russia at the Yalta conference not to go beyond the Elbe in the Magdeburg area. Consequently, although there was comparatively little opposition, the advance was halted in that sector. The Allied flanks to north and south were yet in rear of the agreed-upon boundary between the western Allies and Russia. They gradually advanced eastwards, but at the same time they gave more attention to exploiting their gains with a view to occupying those portions of Germany which by the Yalta agreement were to be permanently occupied by British and Americans. The British on the northern flank turned towards the sea and the approaches to Denmark; the Americans and French on the right turned to an advance into Bavaria.

The German armies on the west were split by the wedge driven to the Elbe. Still having

some defensive power, the German forces resisted, but their ultimate destruction was certain.

THE MAIN RUSSIAN OFFENSIVE

The main Russian offensive was launched on 16 April and was directed towards Berlin, only some forty miles away from the line of departure along the Oder River. A direct attack was made along the shortest line of approach; it also sought to envelop Berlin from the north. A second, but not secondary, attack was launched from the Neisse River, having two prongs. The northern one, composed of large armored forces, headed for a breakthrough, and then to an attack on Berlin from the south. The southern Russian column headed towards Dresden, with the mission to head off German forces in that area from attacking the rear of their northern column. Unlike the offensive of the western Allies, the Russian front was not continuous until later when junctions were effected. Disregarding losses, the Russians broke through.

Berlin was reached on the 22d, and a fierce attack was started immediately. This developed into a savage street and house battle which continued day and night until the final battle on 2 May when 135,000 remaining Germans surrendered. This seems like a large force to defend one city, but they had almost no transportation.

THE GERMAN DISSOLUTION

German General Headquarters was at Berlin. It operated in a deep dugout under the Chancellery. On 21 April, when the Russians were at the gates of Berlin, shells fell near the Chancellery. At the daily General Staff meeting, there was a divergence of opinion as to what to do. Hitler was present, but was in a hopeless condition, and had nothing to suggest. Nor would he approve of any plan.

On 22 April, what seems to have been the final meeting took place from 3:00 PM to 8:00 PM. Hitler was more hopeless. He listened listlessly to reports and advice and then announced that the others could do as they pleased. For himself, he was satisfied that Berlin would fall within two to seven

days; he would stay and fall with it. The General Staff thereupon disbanded and went off separately.

Himmler went to Flensburg, where by 24 April he had established liaison with Sweden and had proposed surrender to the western Allies. Goering went south to Berchtesgaden to organize there a center of resistance, but failed to accomplish this. General Jodl joined troops outside, as the road to the west was yet open, and made a serious effort to relieve Berlin. A new Twelfth Army was organized of troops opposite the American Ninth and First Armies between Tangermünde and Dessau. Jodl had correctly guessed that the Americans would not cross the Elbe and attack his rear. The Twelfth Army was ordered to advance to the line Potsdam-Jüterbog.

Between the two Russian attacks from the east and south of Berlin was a large lake area southeast from Berlin not occupied by the Russians. The German Ninth Army was ordered to concentrate all available troops in that sector and then advance west to join the Twelfth Army. A third German army taken partly from the fronts of the First and Third U.S. Armies in Saxony was ordered to attack northwards from the line Dresden-Görlitz. To enable Berlin to hold, reinforcements were sent in, partly dropped by air.

The southern attack met the Russian force specially detailed to watch for a counter-offensive in this direction. The Germans succeeded in reaching the line Königsbrück-Kamenz, but had insufficient force to go farther. The Twelfth Army in its attack reached the line Potsdam (exclusive)-Treuenbrietzen, and established a precarious connection with the Berlin garrison. It was attacked by the Russians on both flanks, but on the whole maintained its initial gains. The Ninth Army completed its assembly and then started west. Its preliminary movements had been noted by the Russians, who thereupon attacked it from all sides. In spite of this, in a hedgehog formation and practically without motor transportation, it did

move west and, not without severe losses, joined the Twelfth Army by 2 May.

By this date, the western Allies had refused to deal with Himmler, but they had agreed to accept surrender of German forces by separate armies. Thereupon the Ninth and Twelfth Armies reversed their fronts and marched back to the Elbe, where on 3 and 4 May they surrendered to Americans. The garrison of Berlin, without transportation and practically surrounded, could not break out, and surrendered on the 2d.

German troops in and south of Saxony and those facing the Russians in Silesia, Moravia, and Austria received orders to break contact with the Russian armies and march west and surrender to the western Allies. This movement commenced on either 2 or 3 May. The Russians do not appear to have noticed it until 5 May, when they started a pursuit. The maximum distance for the Germans to go was 200 miles. The Germans completed this movement on 11 May, their rear guards fighting until this day. How large a number of Germans reached British and American lines is, at date of writing, a secret.

In the meantime, German forces in all of north Germany reported their willingness to surrender to the western Allies on 3 May, and signed a surrender act effective as of 8:00 AM, 5 May. By what appears to have been a secret advance agreement, German General Headquarters issued instructions, and broadcast them, to allow Allied (British) troops to enter Denmark and Norway without delay. First British troops arrived at Copenhagen by air on 5 May.

A German general Act of Surrender was negotiated at Reims and signed at 2:41 AM, 7 May. This provided for the surrender of all German forces to the western Allies and Russia effective as of 11:01 PM, 8 May. This surrender was broadcast by Germany, but was held secret by the Allies pending a ratification meeting apparently demanded by Russia. This was signed about midnight, 8-9 May, near Berlin, at the local Russian command post. It has not been made public at date of writing.

German forces—two armies—in Austria surrendered to American forces on 5 May.

OPERATIONS ON THE SOUTH FRONT

On 1 March the Allies held a line across the neck of the Italian peninsula. There were no important operations until 9 April when the Allies commenced an offensive on the east flank. On 16 April the attack was made general along the entire front. It had unusually strong air support. By 25 April the Allied right entered Ferrara, and the German line became untenable. On that day the German commander decided to surrender and sent word to Mussolini to meet him to discuss how to go about it. The German was late at the prescribed meeting point in Milan. On the way there from his headquarters at Como, he had been delayed by a road block operated by Partisans. Mussolini, fearing treachery, thereupon fled, and also ran into the Partisans and was murdered.

When the German did arrive at Milan, Mussolini had already gone. Consequently he got into touch with the Allies early on 26 April. An Act of Surrender was signed at 2:00 PM,

29 April, effective at 12:00 noon, 2 May. It cannot now be established that this German surrender was the result of the final Berlin conference on 22 April. But the dates and methods employed indicate that it was. The delay of three days between signing and the date fixed for surrender, during which the surrender was kept secret, enabled the Allied troops to reach the northeast boundary of Italy, with one exception, before troops of Russia and its Yugoslav ally did. The exception was Trieste, where the eastern and western Allies arrived at the same time.

So ended the war with Germany. A critical examination of recent campaigns is not yet possible. Essential information for an analysis must wait until it is known just what forces and strengths were involved, what their orders were, and their casualties. Most of this is still secret.

But to the officers and men who fought and died for one of the greatest victories which the world has ever seen, there is due honor, and the gratitude and appreciation of the entire nation.

Britain's Maquis

From a British source.

It has been officially revealed that in 1940 an underground movement was organized in Britain in preparation for a German invasion of England.

According to unofficial reports, the movement was so secretly organized that even today many members do not know the names of others. It was not founded on any continental example, since it was established before France, Belgium, Holland, Denmark, and Norway organized their undergrounds. The members had radio transmitters and receivers, messengers and code clerks, and were organized and supervised by 300 specially picked officers of the British Army Special

Duties Branch. Members were all civilians doing ordinary jobs.

Radios hidden in the countryside in small concrete hideouts were so well camouflaged that many people have walked over them without suspecting that anything was there. It was no amateur force, but highly skilled, minutely trained, and kept in training by an army of intelligence officers, so that if the Germans had invaded England a merciless underground warfare could have been carried out against them.

The names of members remain on the files still marked "top secret," and will remain unknown lest the occasion should ever arise again for them to be ordered underground.

Repeat Your Intelligence Training

LIEUTENANT COLONEL JAMES F. MILLER, *General Staff Corps*
Instructor, Command and General Staff School

"WHAT was your division doing when you left that active theater?" a returning G-2 was asked.

"We were training on fundamentals," came the prompt response.

"Training! But you'd been in combat for months!"

"True, yet at every opportunity, during each lull, in fact every time we had a chance, we renewed our training."

"But what can you teach battle-wise troops?"

"Fundamentals."

Credit for these answers cannot be given fairly to any one officer, for the answer has been the same so often. Training is continuous.

Ever-changing personnel, due to promotions, transfers, replacements, casualties, and what not, leaves G-2 with the "state of intelligence training" an unknown quantity. The test of fire develops weaknesses. Changes in enemy methods and changes in terrain call for new application of old principles. Just as a championship football team returns on Monday to "skull practice" and drill on fundamentals, so G-2 must reiterate basic intelligence principles, correct bad practices, and correct weakness.

No unit, it is safe to say, ever left this country without training and experience in simple message writing. Those experienced in combat insist, however, that faultily written reports and poorly written messages are a most general weakness. Constant drill (under combat or closely simulated combat conditions) in this fundamental is the cure. Once proficiency is obtained, continuing practice alone will maintain it.

The establishment and operation of observation posts is a subject iterated and reiterated in training. Few units going to the Southwest Pacific, however, have moved into the fight without first needing (and getting) intensive review and practice in this simple yet important art.

One could go on enumerating the need for

review, at each opportunity, of every item of intelligence instruction. Some G-2's have felt, privately, that this was due to a weakness in the basic instruction they have given. They forget that constant repetition is *essential* for successful teaching. Instead of going back over familiar ground, correcting erroneous impressions and *clinching* the lessons previously taught, the issue was *dodged*.

Fortunately, however, many intelligence officers, through foresight or circumstance, realize this need for repeating, refreshing, and reiterating instruction in training. Now the object of all training in time of war is success in battle—victory. Success results from each unit and each man doing his small (but important) part in a complete and most proficient manner. Failure by some small part of the machine must be prevented.

Recently returned from active combat, an officer described many an observation post at night as looking like a "crowded, dimly-lit night club," because of the many groups congregated around peering at maps by flashlight. Failure to observe blackout discipline and rigid OP discipline could well have caused the loss of such an observation post as just described. Often, want of information which a good OP could furnish can in turn cause faulty decisions to be made. Repetition of training in rigid OP discipline alone may not bring victory, but its failure could contribute to enemy success.

G-2's intelligence instruction naturally falls into two general classes: (1) training of Military Intelligence personnel, and (2) training of all personnel in intelligence subjects. The former must be more detailed, of course. Time for training each group is always limited. The wise G-2, however, is prepared and ready to supplement and refresh the training of either group constantly. To be ready, he has plans, schedules, and *tools* at hand to take advantage of every opportunity. Experience indicates that few extended periods for uninterrupted schools are available to a combat unit. Scattered periods for

refreshing all or part of the intelligence personnel do occur. If time must be taken *then* to make preparations, the opportunity will be wasted. If prior planning leaves G-2 "ready," these scattered periods will pay dividends.

Intelligence training of different parts of combat organizations can be had through concurrent training (concurrent with other training) if each unit commander is ready (by G-2 having made necessary preparations for him) to teach intelligence. G-2 should give him the means, the reference, the schedules, and the aids, and when opportunity knocks, G-2 should help the unit commander respond to her call.

Since fundamentals are quite constant, since repetition and practice develops proficiency, plans *can* be made to increase intelligence proficiency if G-2 has plans ready for use which "stick to fundamentals."

Field manual references; notes on your unit's experience; short, interesting exercises testing and improving the senses (of hearing, seeing, smelling, and feeling); plans for conducting instruction; and simple aids to teaching will give G-2 a start toward being ready to "brush up" intelligence personnel "during a breather" on the following subjects:

- Map Reading
- Aerial Photo Reading
- Observation
- Scouting
- Creeping and Crawling
- Message Writing
- Counterintelligence matters
- Sketching
- Time and Space Estimation

Likewise, short schedules, complete and ready to use, broken down into many small periods, which G-2 can prepare, will permit the harried unit commander to take advantage of time when all his troops are not busy and improve their state of training. A list of subjects with manual references, like the following, prepared for a unit commander, has helped materially where G-2 or his assistants are ready to lend a hand.

To illustrate, here is a review list for combat troops:

SECRECY DISCIPLINE, FM 21-45:

- Meaning. Par. 120 and 122.
- Talking with strangers. Par. 121.
- What can be written home. Par. 124.
- Troop movements. Par. 123.
- Censorship of letters. FM 30-25, Sec. IX.
- Diaries and photography. Par. 125-126.
- Classified documents. Par. 127.
- Actions prior to going into combat. Par. 128.
- Action in case of capture. Par. 129.
- Rights of prisoners of war. Par. 130.
- Propaganda. Par. 131.

COMBAT INTELLIGENCE, FM 21-45:

- Estimation of troop strength. Par. 45 (a) and (b).
- Estimation of troop strength. Par. 45 c and d (1) (a) to (e).
- Estimation of troop strength. Par. 45 d (1) (f).
- Oral messages. Par. 46 (a) and (b).
- Messages. Par. 46 (c).

PRISONERS OF WAR, FM 30-15:

- Coercion. Par. 8.
- Segregation. Par. 9 (a) and (b).
- Disposition of prisoners' effects. Par. 9 c.
- Procedure (front-line units). Par. 9 d (1), (2), and (3).
- Responsibility of guards. Par. 9 d (4) and (5).
- Enemy deserter. Par. 14.
- Enemy civilians. Par. 15, 23 b.

COUNTERINTELLIGENCE, FM 30-25:

- Object and measures to take. Par. 1, 3.
- Secrecy discipline. Par. 6-7.
- Concealment. Par. 8-13.

Each subject as thus broken down *can* be covered in a ten-minute period. Those subjects where greater emphasis is desired may be prolonged, of course.

Plenty of time is available if *we* take full advantage of it. Deep, involved studies are all right in their place, but until fundamentals become second nature, their reiteration will bear greatest dividends. So *repeat your intelligence training* and the results will surprise you.

Kuzume Makes the Team

COLONEL JACK W. RUDOLPH, *General Staff Corps*

AMERICANS would have called him Naoyukie Kuzume. But the Japanese, who have a cockeyed angle on a lot of things, including their "divine" mission to rule the world for the glory of Nippon and the Greater East Asia Co-Prosperity Sphere, called him Kuzume Naoyukie. Since Naoyukie was a Jap and since what follows is told from the viewpoint of the sons of—heaven—we'll call him that too.

Kuzume Naoyukie, late Colonel in the Imperial Japanese Army, commanded the 222d Infantry Regiment and the garrison of Biak Island when Biak was an outpost of Nippon's crumbling empire of conquest. Together with some 10,000 slant-eyed comrades who lived and died miserably on a wild and hostile jungle island they must have thoroughly hated, Kuzume Naoyukie is enshrined today in Yasukuni as one of his country's minor gods. He made it the hard way.

On the morning of 27 May 1944, assault troops of the U.S. 41st Infantry Division stormed the south beaches of Kuzume's stronghold. Twenty-seven days later, huddled in a miserable island cave, Kuzume Naoyukie accepted the inevitable according to the code of the Samurai. Ceremoniously burning his regimental colors, he ordered the fanatical banzai charge that has heralded the end of so many Nipponese hopes, and committed hara-kiri. He was a long way from sunny, flower-perfumed Japan.

Biak Island, lying athwart the entrance to Geelvink Bay between the head and shoulders of lizard-like New Guinea (Figure 1), is a triangular-shaped mass of coral and limestone jutting out of the green sea. Like its smaller sister island of Soepiori to the northwest, Biak is blanketed by a dense and tangled jungle wherein an average rainfall

of more than a hundred inches a year spawns the ultimate in tropical wilderness.

The hypotenuse of Biak's triangle faces northeast (Figure 2). The northern third of the island is a rugged mountain mass, falling away to a central tableland which stretches in a series of relatively flat terraces toward the south coast. Here a border of narrow beach fringes a rampart of steep coral cliffs, barring the way to the terraces behind them.

These cliffs are a series of coral ridges parallel to the coast, rising precipitously be-



FIGURE 1.

tween one hundred and three hundred yards from the shore. Captain George Andrew, who landed with the first wave and subsequently fought through the Biak operation, describes them as follows:

"Many a ridge crest is so sharp and narrow that it is traversed only with difficulty. Rising to an elevation of 250 to 300 feet above the beaches, they form an impressive barrier between the coast and the comparatively flat inland terrain. This elevated coral reef is evidently the result of several geological up-thrusts, for even in its most perpendicular places it consists of a series of terraces now overgrown with thick rain forests.

The cliffs and terraces are pocked with caves and potholes, many of them large enough to conceal a battery of mortars and to give shelter to several hundred men. Many of these caves are entered from the terraces

through small openings. The potholes have been formed by similar caverns into which the roofs have collapsed. Their sides are often pitted with smaller caves and passages which may lead to larger caverns."

Midway of the southern coast line, between the villages of Mokmer and Sorido, the ridge turns away from the beach, runs generally

The mission of the Biak garrison was to complete the airstrips and to secure the island against an invasion that, after the fall of Hollandia, appeared inevitable. Kuzume accordingly formulated his defense plan, the salient features of which were the defense of the vital landing fields and the repulse of any amphibious attack "at the water's edge."

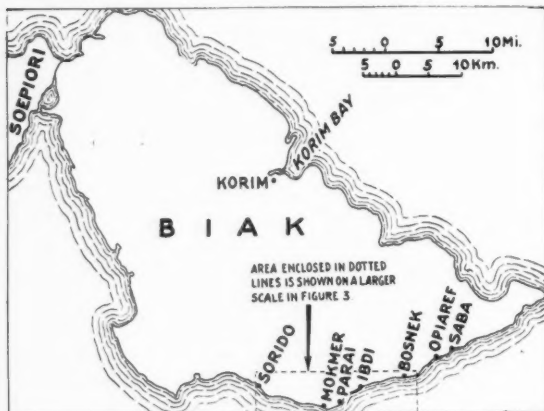


FIGURE 2.

north for about a mile, then west again before angling back to the coast (see Figure 3). In the small, comparatively flat and brush-covered pocket thus tucked between the hills and sea lay the prize for which Biak became a battlefield. Here, early in 1944, the Japanese began construction of three airstrips—those vital counters in the grim contest for possession of New Guinea. These airfields, and nothing else, made the jungle-choked rockpile called Biak a pearl of price in the struggle for the South Pacific.

To rush completion of these fields, whose importance increased greatly after the loss of Hollandia (Figure 1) in April, the Japanese garrisoned Biak with approximately 10,000 men under Colonel Kuzume. Besides his own 222d Regiment of 3,000 men, he commanded a naval guards battalion, a tank detachment (seven tanks), and miscellaneous engineer, ack-ack, and service units. About one third of this force rated combat status, but in an emergency Kuzume could and did arm his service elements and fight them as infantry.

The eastern end of the island, particularly the airstrips, was to be held at all costs, landing attempts to be met and crushed on the beaches. A landing elsewhere on the island was to be resisted until the arrival of reinforcements. If a landing in the vital area was successful, it was to be contained by periodic assaults from prepared positions. All this was orthodox planning, implemented by careful dispositions and construction of field fortifications.

The 1st Battalion, 222d Infantry, was assigned a sector east of a line running north-west through the village of Opiaref (Figure 2), with the naval unit, 450 strong, on its right between Opiaref and Bosnek. The mission of these units was to repulse any landing on the eastern part of the island.

The zone between Bosnek and Sorido (Figure 3), which contained the vital landing strips, was the responsibility of the 2d Battalion, backed by the 3d. The latter, less two companies, constituted Kuzume's reserve and assisted in the feverish work to rush the still unusable airdromes to completion.

One reinforced company was ordered to construct a road between Mokmer and Korim Bay on the north coast, detaching a party to cover Korim and report any landing on that shore. The tanks were assembled in the Saba area (Figure 2), some ten miles east of the airfields, while the engineers began construction of roads and fortifications. They were also prepared to carry out demolitions (Kuzume called it "explosive warfare") when called upon.

Automatic weapons and anti-aircraft ele-

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ments were charged with the ack-ack defense of the air fields. Supplies were to be dispersed in small dumps, and cave defenses along the cliffs were to be stocked with ammunition, food, and other necessities to last four months.

Kuzume ordered the construction of concrete pillboxes along the coast at key points but left the selection of sites and the organization of sectors to zone commanders. The latter were given wide latitude in organizing and conducting the defense of their sectors.

On the logical assumption that any serious landing attempt would strike the southeast coast, the defenders constructed a haphazard line of reinforced caves and pillboxes among

narrow beach defile and block an approach from Bosnek. Although the main ridge was not so precipitous nor so high at this point, the confusing pattern of cross ridges and depressions, together with a lack of trails, made it an area which could only be traversed with great difficulty under even the easiest conditions.

This perimeter came to be known as the Ibdi Pocket (Figure 3). Recognizing it as a valuable blocking position, the Japanese continued, even in the midst of battle, to build more pillboxes and to repair those damaged in the fight.

North of Mokmer airstrip a large cavern

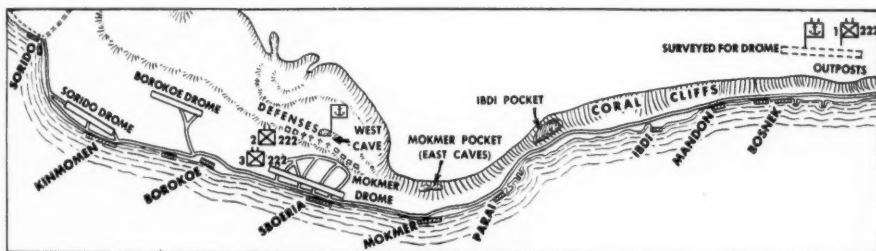


FIGURE 3.

the rocks above high water. Between Opiaref and Saba the job was exceptionally well done. These caves, entered from defiladed approaches in rear, were well camouflaged and fortified by concrete gun ports covering wide fields of fire across open water. They were backed by mortar positions guarding their flanks and gaps between them. The wide, open beach at Bosnek was defended by four large steel and concrete pillboxes, at least one of which mounted an artillery piece.

The principal defensive works covered the airdromes and were well designed to deny possession of the fields except after costly and direct assault. Main defenses consisted of three pockets in the ridges behind and to the east of Mokmer airstrip.

Between the coastal villages of Ibdi and Parai, among a series of tumbled, knife-like coral ridges, a strong perimeter of mutually supporting pillboxes was built to cover the

runs under the terrace overlooking the field. The cave, about a hundred yards long, has two gallery entrances, leading into the chamber from the rear at a forty-five degree angle. At its opposite end a large sump, once part of the original vault, whose roof has fallen in, opens into the cave. This pothole, sixty to eighty feet deep and measuring one hundred feet across its long axis, has sides so precipitous that it can be entered only by the use of scaling ladders.

The Japanese called this the West Cave and made it the anchor for the final defense of the airfield. Capable of housing a large force, it was used as a billeting area and headquarters. Around it was built a powerful series of pillboxes and extensive log-and-coral emplacements along the ridge.

Midway between the Ibdi Pocket and West Cave another strongpoint was constructed on the ridge dominating Mokmer village. The

position, built around two large sumps and connecting caverns, was known as the East Caves. Here again the galleries were used as living quarters and the sumps as emplacements for mortars and machine guns whose fire covered the road and beach approaches to the airstrips.

As long as West Cave was occupied, the airfields were neutralized. With the Ildi Pocket guarding the eastward entrance to the little valley and the East Caves covering the beach defile, these perimeters constituted a powerful obstacle to possession of the coveted strips.

No defenses were prepared along the coast road from Bosnek to Mokmer. This road, main approach from the east, ran along the narrow corridor between the cliffs and the sea. At one point the corridor narrowed to a bottleneck only a few yards wide. Not until it had actually been penetrated and later cleared was any attempt made to block it, nor were any obstacles or mines ever laid to obstruct movement to or on the beaches.

Artillery installations, while well sited, were inadequate and incomplete. Most of the guns were concentrated to cover the airdromes and their direct sea approaches. These positions included at least a battery of mountain guns, three or four antiaircraft guns of three-inch caliber, many mortars and automatic weapons, and four 120-mm dual-purpose naval guns.

A six-inch rifle was installed south of the Mokmer strip and another in the Bosnek area. These weapons had fields of fire for at least six miles up and down the coast, with overlapping sectors in the center. One naval 120-mm dual-purpose piece was emplaced on the Bosnek beach, while several other navy six-inchers were being installed but were not ready for action on D-day.

From the date of the Hollandia landing on 22 April, Colonel Kuzume had slightly more than a month to prepare his defenses. There is evidence, too, that if Japanese intelligence did not know the exact point of invasion, it had a pretty good idea of when it would come. Several days before the assault, Kuzume apparently received warning to

expect it about the end of May. In spite of this, however, he was surprised by the landing at Bosnek and offered no opposition when infantry of the 41st Division swarmed ashore there in broad daylight at 0715 on 27 May.

His forces were disposed generally in accordance with his plan but were probably being held mobile and were not manning their positions. The 1st Battalion and the naval contingent were bivouacked behind the coral ridge, about two miles north of Bosnek, where Kuzume's regimental command post was also located. Only outposts occupied the hills above the landing beaches and they retired without firing a shot. One group of about fifty panic-stricken soldiers hid in a nearby cave where, upon discovery, they refused to surrender. All were either shot down or committed suicide.

The shock apparently unnerved the surprised Kuzume, who offered no opposition to the initial assault waves. The Americans quickly seized the dominating ridge, established their beachhead, and then moved forward in two columns up and down the beach. One advanced east along the coast toward Opieref where the road crossed the ridge into the interior, while the other advanced westward in the direction of the airstrips. By nightfall the eastern column had occupied Opieref and the western force had passed the Ildi Pocket without being fired on. The latter halted for the night at Parai, halfway between the pocket and the Mokmer position.

Since Ildi had been negotiated without drawing fire, it is probable that the position was not occupied in force. By day's end the Americans had passed through the narrow coastal defile and penetrated to within two and a half miles of their objective.

During the night, however, Kuzume recovered his balance and reacted to the threat. As the advancing Americans reached the eastern edge of the airfield next morning, the colonel attacked and drove them back 2,000 yards to Mokmer village. His men on the dominating ridge above the town promptly opened a deadly fire with previously ranged-in mortars and machine guns, pinning the invaders down.

That afternoon a flanking column advanced

along the ridge and cut in behind the Yanks. This maneuver isolated the hard-pressed American battalion, except for one company which fought its way out of the trap. Kuzume had his enemy exactly where he wanted him and laid his plans for a quick annihilation.

During the night he brought the 1st Battalion into the airdrome area. Next morning, with his entire regiment concentrated, he threw his 2d and 3d Battalions against the trapped Americans in three separate and heavy attacks. These assaults failed to overrun the hard-pressed invaders but inflicted heavy casualties.

The opening attack, launched at 0700 on the 29th, was paced by Kuzume's tanks. The seven vehicles, advancing in two waves half an hour apart, were promptly wiped out. The first wave of three was met by five U.S. medium tanks, which had rushed to the aid of the beleaguered infantry, and was quickly destroyed. When the remaining four attacked at 0730, over the same ground and in the same formation, they were also wrecked in short order.

Although he had not crushed his trapped opponents, Kuzume's attacks and his continuous fire from the Mokmer Pocket had almost shattered the American force. Before he could launch the knockout blow, however, nightfall intervened. Under cover of darkness, a rescue flotilla moved in by water and evacuated the survivors, who were so badly mauled that the battalion was unusable for the rest of the campaign.

Colonel Kuzume promptly moved down through Mokmer to the narrowing defile and took up positions from which he effectively blocked further attempts to reach the airfields by the coastal route. He had lost the first round, but the second was his by a wide margin.

Next day he ordered the 3d Battalion into the Ildi Pocket, left the 2d to hold the defile, and moved with the 1st Battalion back to the original bivouac north of Bosnek. Here he encountered the American column which, after crossing the ridge at Opiaref, was advancing across the flat inland plain to take the airdromes in rear. The 1st fought a bitter

rear-guard action back to the Mokmer area, where regimental headquarters returned to West Cave.

During this withdrawal the 3d Battalion made no effort to assist its retreating comrades. It neither withdrew nor attempted to strike the advancing Americans in flank or rear, but holed up in its perimeter and was cut off without a fight. By D plus 7, reinforcements had arrived for the attackers and had moved north of the ridge, securing the American communications and destroying Kuzume's last chance to attack and crush his enemies in detail.

On 12 June the 1st Battalion, reinforced by hastily armed service troops, was driven over the ridge and onto the Mokmer strip. This defeat required Kuzume to withdraw his troops to the terrace north of the field, in the vicinity of West Cave. A week later his blocking position on the coastal road was forced, and the American columns established contact.

While Kuzume was being squeezed into his final defensive pockets, two attempts were made to reinforce him. On 12 June about 200 riflemen landed at Korim, followed a week later by an additional battalion of infantry. These reinforcements were thrown piecemeal into action. Attacking a company at a time, this previous help was dissipated and destroyed without having rendered the slightest assistance to the sorely pressed Colonel.

By D plus 19, when more American reinforcements landed, the bulk of the defenders had been compressed into the area around the airdromes. The 3d Battalion was still cut off in the Ildi Pocket, while the Mokmer Pocket was also manned. Neither garrison offered more than occasional patrols and slight harassing fire that closed the coastal road for brief intervals.

A coordinated American attack on 20 June cleared the strips and drove Kuzume onto the ridge north of the fields. The Colonel, with a considerable force of mixed units, barricaded himself in the West Cave. All next day this force endured a savage and unremitting attack which it resisted bitterly.

One by one the defending pillboxes were

reduced and their savagely fighting garrisons wiped out. Sniper fire, tank guns, and grenades drove the desperate defenders away from the cave mouths, back into the dark chambers. Here any hopes of prolonged survival were short-lived.

Although the winding tunnels were protection against the flame throwers that now came into action against them, the harried fugitives soon discovered that the ingenious Americans had a solution. Drums of gasoline were brought up and poured into the sloping entrances. Grenades transformed the gasoline into rivers of flame that drove the Japanese deeper into the caverns, which soon shuddered with the detonations of TNT blocks lowered into them.

That was enough for Kuzume. That night he called his staff and survivors around him in the battered vault. He ordered all who could still walk to leave the cave and launch their final banzai attack. Hand grenades were issued to the wounded with orders for self-destruction. Then Kuzume Naoyukie impressively set fire to his regimental colors, retired to a far corner of the cave, and, in obedience to his code as a defeated Samurai warrior, disembowelled himself.

Later in the night the survivors hurled themselves against seasoned jungle fighters who had seen such charges before. The banzai was crushed as furiously as it had been launched.

The charge of the night of 21-22 June ended the organized defense of Biak. The troops isolated at Ibdí and Mokmer held on tenaciously and had to be slowly and completely eliminated. Tedious as this phase was, it was of little tactical importance, since the airfields were clear and secure. Before the last of the trapped Japs were liquidated, American planes were operating from Kuzume's ill-starred strips. A few survivors escaped into the rugged northern hills, there to be systematically hunted down or to succumb to the revenge of the jungle they had defied.

* * * * *

Captain Andrew says that Kuzume's defeat was inevitable from the day the Americans landed on Biak. Strategically, the statement

is probably true; nevertheless, a study of his subsequent tactics confirms the suspicion that Colonel Kuzume was his own worst enemy. A more flexible commander could, at the minimum, have made the conquest of Biak a far more protracted and costly victory.

Kuzume fought stubbornly and with desperate courage, as the Japanese always do. From the beginning, however, he made mistakes which progressively hurt his chances and made his defeat more prompt. These mistakes were important, for they were typical of Nipponese weaknesses which have shown up repeatedly and may be expected to occur again.

His original plan was sound. He made his dispositions with care, he delegated responsibility to his subordinates and left himself free for the overall conduct of the battle. He correctly diagnosed the area of the landing and he knew the approximate time it would come. There was nothing wrong with the siting nor quality of his field works, and although they lacked depth, this was partly due to lack of time in which to prepare them.

But having formulated a good and careful plan, Kuzume wrecked it by allowing himself to be surprised. The landing caught him out of position and apparently rattled him so badly that he could think of nothing to prevent consolidation of a beachhead which could have been a costly if not untenable foothold. For an entire day the Americans were allowed to advance without interruption or loss.

The D plus 1 encirclement of the advancing U.S. battalion at Mokmer was extremely well done. Although he failed to destroy his trapped adversaries, Kuzume's attacks were so punishing that they effectively neutralized a good proportion of the landing force. The badly pummeled unit was never again fit for use in the campaign.

But even in this, the high point of his defense, Kuzume revealed his weakness in the destruction of his armor. Having lost almost half his tanks in the first assault, he blindly threw the remainder into the same trap where they were likewise destroyed. He simply could not break away from the Japanese addiction

to following a set plan even in the face of obvious failure.

Another mistake was failing to guard the breach in the ridge at Opiaref, through which the Americans advanced to outflank him. He had the troops to do this; the naval battalion, which should have done the job, appears never to have played a role in the fight. Dispersed all over the island, it was gradually rounded up in weak detachments.

The rearguard fight of the 1st Battalion, while well executed, was futile in the face of two-to-one odds. It was an isolated action, fought without the help which was readily at hand, and accomplished little more than a slight delay. If, instead of dispersing his regiment again after having concentrated it, Kuzume had held his blocking positions lightly while throwing his main body into an envelopment of the American column behind the ridge, he might have changed the whole course of the battle.

With part of their force already out of action, a repulse of the column behind the ridge would have placed the Americans in the beachhead in an extremely precarious position. Kuzume had little to lose and much to gain by a swift offensive blow here, but he lacked the ability to make such a decision. The arrival of American reinforcements finally snuffed out the opportunity.

The fate of his own reinforcements was also typical. Arriving on the battlefield in small increments, they were thrown into futile counterattacks, a company at a time, and destroyed without achieving any worthwhile results. It was Guadalcanal again on a smaller scale.

The arrival of additional Americans com-

pletely upset what was left of Kuzume's plan and rendered futile his subsequent defense. His plan had revolved around the invulnerability of the pockets between the Americans and their objective. These pockets were now reduced to death traps which were little more than a nuisance to the invaders.

Having lost the fields, Kuzume did not recognize these pockets for the traps they were, but holed up in them in slavish adherence to his original concept. Once sealed in, all he could do was defend them to the inevitable last man. Had he abandoned them and moved into the hills, he might have carried on mobile offensive operations long enough to hold on until substantial help arrived or his troops were evacuated.

For all his mistakes, Kuzume put up such a stubborn resistance that he eventually required the Americans to double their attacking force. Tactically, he had much in his favor, points which a more daring and imaginative leader might have put to good account. But, like so many of his compatriots, he lacked the flexibility to change his plans in the heat of battle. Because he could not improvise and make prompt decisions in the face of failure, he went to his death a frustrated man.

Frustration dogged him even in death. Months later, long after Biak had become a garrison post with screened barracks and quintuplicate requisition forms, a fever-ridden, hungry Japanese fugitive walked into a mess hall and gave himself up. In exchange for a square meal, he offered the slightly charred remnant of a Japanese flag he carried wrapped about his waist. It was Kuzume Naoyukie's battle standard.

A British officer points out the fact that in today's war, responsibility has been lifted from the shoulders of the individual far too often. He says, "The tendency must be rather to thrust responsibility on to him, and the more the better . . ." Nowhere is this more true than in operation of a preventive maintenance program, for its success depends almost entirely on performance of services by the individual soldier.

—Maintenance Division, ASF

Strategic Objectives

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ALMOST any morning while reading the morning paper at breakfast you will undoubtedly find some mention of air operations against the industrial empire of Japan. When you read the headlines and learn that large formations of B-29's have attacked the aircraft plants at Nagoya or Tokyo, you are prone to take the attacks for granted, give the boys who did the dirty work a mental pat on the back, and then forget about the whole thing. However, that is not all there is to such an attack. Was this operation merely an idle impulse on the part of the commanding officer of the organization which performed it? The answer is definitely "No." In back of the actual operation of attacking this target are long hours of research and consideration on the part of many people. In view of this fact, it seems fitting to take time to consider the problem of why and how these targets are selected.

First of all, let us consider the reason behind these strategic air operations. A very broad definition of the reason is the "furtherance of the strategic plans," but this does not give us a very complete picture. Let us put it this way: the mission is the "progressive destruction and dislocation of the enemy's military, industrial, and economic systems to a point where his capacity for armed resistance is fatally weakened." Even this definition does not give a complete picture because sometimes the operations may be carried out against objectives which do not fall strictly within the categories of military, industrial, or economic systems. An objective which does not fall within these three categories may best be illustrated by an operation whose sole purpose is to lower the morale of the civilians, such as dropping propaganda leaflets.

If this is the case, let us make a brief study of some of the possible objectives for these operations to see why they are selected and of what they consist. First, let us list the various categories of objectives and then break each one down into the various targets

of which it is composed. These objectives may be listed as follows:

- a. Concentrations of forces, land or sea.
- b. Enemy lines of communications.
- c. Hostile sources of matériel.
- d. Sources of power.
- e. Enemy air forces.

Now that we have listed the general categories of objectives, let us break each one down into its possible targets and see why it should be classed as a strategic objective.

Concentrations of land forces will be found to include both military and naval establishments, bases, camps, or schools. It is necessary at one time or another to concentrate personnel, either for purposes of training, rest, or education. These concentrations may take the form of training camps, posts, stations, or general and special schools, such as the enemy's counterpart of the Infantry School at Fort Benning, Georgia, or the Command and General Staff School at Fort Leavenworth, Kansas. We may find that they will consist of technical schools such as Scott Field, Illinois, where radio operators are trained for the Air Forces, or research installations such as Wright Field. By striking these concentrations we can deprive the enemy of their use and of the personnel who were being trained in them. It is easy to visualize the effects of a possible shortage of highly trained and skilled specialists such as electronic operators. However, it is not quite so easy to visualize a shortage of less specialized personnel. Staff officers may appear to be an inexhaustible item, but the fact remains that more is required of an officer than just battlefield training to make him a qualified staff officer. He must have the background of basic principles and procedure in order properly to apply personnel, matériel, and information to produce a successful operation. This background is usually presented at one specialized school devoted to this subject alone and to nothing else. If we can destroy this school, and along with it some of the po-

tential material in training, we will deprive the enemy of the steady flow of staff replacements which he so badly needs to carry out present-day combat.

Concentrations of sea forces are among the foremost of all strategic objectives. The reason for this is that no nation is completely self-sustaining, especially where the conduct of war is concerned. Every nation finds it necessary to import certain items of either raw or finished materials, and the only way in which they can do this is by maintaining the necessary shipping. If it is possible for us to deprive him of this shipping by destroying it or damaging it beyond repair, we will eventually cause him to use inferior matériel or to do without certain items of matériel which are vital to the conduct of his operations.

We will normally find the enemy making every effort to protect this shipping with naval vessels. Therefore, it will be necessary for us to destroy his naval power as well as his merchant vessels. Another reason for the destruction of his naval power is that it is a potential threat to the interruption of our supply lines.

For example, we can take the U-boat pens along the coast of France. Germany was carrying out an extensive war against our shipping which was transporting supplies to our forces overseas. The losses incurred by the U-boats were such that action on our part was required. We therefore determined that the easiest way to counteract these operations was first of all to destroy the factories where the U-boats were being fabricated, and secondly, to destroy, or damage beyond serviceability, the pens which were used for refitting and resupplying these boats. This was in conjunction with the operations conducted by our navies. The operations were eventually successful, but it required the diversion of a large force of our bombers to neutralize this threat to our supply lines. The U-boat became a strategic target because it was interfering with the execution of our strategic plans.

The German battleships *Scharnhorst*, *Gneisenau*, and *Tirpitz* were classed in this same category because of their potential

threat to our lines of supply. In this case we find that a force of only three ships became a strategic target. The efforts of the Royal Air Force and part of the British Home Fleet were required over a period of five years before this threat could be satisfactorily neutralized.

The next objective we come to is that of enemy lines of communications. Under this category we will normally find targets such as ports, bases, depots, and transportation systems.

By attacking port and harbor installations, and damaging them, we deny their use to the enemy as points at which to unload the shipping which we have not previously destroyed. We prevent the enemy from being able to use the materials that he has imported from outside sources. In our attacks on St. Nazaire, Lorient, and the other ports along the French coast we had a second purpose which was to deny the use of these ports as refitting and resupply points to U-boats, as previously mentioned.

Bases and depots are invariably found to be points of concentration for parts and completed assemblies awaiting further disposition to the forces in the field. By attacking and destroying these bases and depots, we can deprive the enemy of the use of these materials and thereby create a shortage of critical items at some future time.

Transportation facilities are found to include such targets as roads, railroads, and canals. It is an undeniable fact that once a certain product has been manufactured it has to be transported to another point before it can be used. This requires an extensive and efficient transportation system in order to insure that matériel arrives at the proper time and place. By disrupting this system we can prevent the enemy from moving vital materials from their point of manufacture to the points where they are needed. We can accomplish this by destroying marshalling yards, critical railroad junctions, and the lines themselves. We can crater roads and cause vehicles to take detours. We can destroy bridges crossing natural obstacles and cause the rerouting of both trains and vehicles. By destroying the

locks in the canal system we effectively deny the use of the canals as a means of transportation.

One of the most outstanding examples of the disruption of transportation facilities took place in Italy just prior to the breakout from the Garigliano River in May 1944. For a period of approximately two months prior to the attack, the Twelfth and Fifteenth Air Forces joined hands to carry out a combined operation against these facilities. The final result of this operation was the complete denial to the Germans of the transportation required for needed supplies and reinforcements. Just prior to the attack it was found that the German troops in the front lines were not receiving full rations. They were being rationed ammunition to such an extent that some of the artillery pieces were able to fire only four or five rounds a day. It was impossible for the Germans to move supplies or troops anywhere south of the Arno River by rail or motor transportation. One reserve division moving up to the front found that it had to march the last hundred miles. The morale factor created by such shortages it not conducive to the successful conduct of war. Much the same situation existed in France at the time of the invasion of the Norman peninsula.

Hostile sources of matériel are, logically, one of the best objectives available for strategic operations. Within this category we find the following targets listed: mines, refineries, factories, and assembly plants.

One of the easiest ways to prevent the enemy from obtaining the matériel which he needs for the conduct of war is to deny him the source of the raw materials. We can accomplish this denial by attacking, and damaging or destroying, mines. As these are usually small targets and hard to attack, we find few examples of this type of operation. There is one case on record in which a flight of heavy bombers attacked a coal mine in Manchuria and succeeded in damaging it to the extent of depriving the Japanese of its use for a period of at least six months. This was accomplished by destroying the pumping system which was used to drain the mine, thereby flooding it.

As a mine is a fairly difficult target to hit, the next best way to deprive the enemy of his matériel is by damaging or destroying the facilities with which he refines his raw materials. It is an unfortunate fact for the enemy that practically every type of raw material which is taken out of the ground requires processing of one sort or another in order to get it into a form which is usable. This applies whether it be oil, ore, or gas. The attacks on the Ploesti oil fields come within this category. They were aimed at the source of about twenty percent of the oil supply for Germany. By attacking and destroying these fields we were able to deny the use of this oil or any of its byproducts to the Germans. This was not only felt by the Luftwaffe but by the Wehrmacht as well. By denying this source to the Germans we seriously handicapped their mobility.

Should it prove to be impossible to attack the refineries or the mines, we must select the next most vulnerable point in the chain of production. This is the factory. Here we find that the raw materials are converted into the final shapes in which they will be employed by the military forces. We find that at this point it is more difficult to hinder the enemy because his factories are more widely dispersed than his mines. Fortunately for us the Germans did not disperse their factories before the declaration of war, and we found that there were certain installations in which a large percentage of any given product was produced. A case such as this is the ball bearing industry. It is impossible to manufacture machinery of any type at all without the use of ball bearings to protect the rotating parts. It so happened that about forty percent of the ball bearing industry was concentrated in Schweinfurt. Thus, when it was decided by higher headquarters that the ball bearing industry was to take a high place on the priority list of targets, it was not hard for the Eighth Air Force to select the factories located in Schweinfurt in order to deal the most telling blow in the shortest possible length of time.

Finally, if it is found to be impracticable or impossible to attack any of the previously

mentioned targets, we will find it necessary to turn our attention to the assembly plants where the various parts are gathered and assembled into the complete article. Again we find that we are faced with a further dispersion of these plants, which makes it proportionately more difficult for us to produce the desired effect on the industry being attacked.

The next category of objective that was mentioned was that of sources of power supply. Industry must have power of one sort or another in order to produce the finished article. This power will usually take the form of electricity, steam, or gas. Again we find an objective which, if attacked, and destroyed or damaged, will deny the use of these facilities for at least a short period of time.

Many of you will remember how the Royal Air Force attacked and destroyed the Moehne, Eder, and Sorpe dams in the Ruhr valley. The sole objective of this attack was to deny the enemy the use of the power with which to operate his factories located in the Ruhr. It so happens that the Ruhr valley is one of the most highly electrified areas in Europe, and that the source of the majority of this electrical power was derived from these three dams. The attacks were highly successful and resulted in the complete drainage on the part of the Moehne and Eder dams and the partial drainage of the Sorpe dam. This meant that the Germans would have to rebuild the dams, and then wait until the reservoirs had filled again before they would be able to draw on the electrical power these dams had supplied. A secondary result was achieved with this attack in that many roads and railroads were washed out, many bridges were destroyed, crops were damaged beyond recovery, and many thousands of the workers supplying the labor required in the various industries were made homeless. A further result was achieved in that the population of the Ruhr valley was deprived of its source of water supply. These three dams had provided practically all the drinking water used by the natives of this valley.

We finally come to the last, but far from the least important, objective, that of the enemy air forces. Attacks are being constantly carried out against this objective, both in the air and on the ground. The attacks in the air take the form of aerial combat. Those against the air force on the ground may take the form of attacks against airdromes, where the aircraft are gathered for operations, or of attacks against the assembly plants and factories which produce and assemble the various parts that go into the completed aircraft.

The first requisite for any operation, either land, sea, or air, is to obtain and maintain air superiority. Without this superiority no force can operate freely, as has been demonstrated in both Europe and the Pacific. At such times as the Germans utilized the remnants of their Luftwaffe in mass they were able to gain temporary local air superiority, thus permitting their ground forces to attack without hindrance from the air. An example of this occurred at the time of the Battle of the Bulge. Von Rundstedt was able to muster a force of about one thousand aircraft which he used to gain local air superiority and assist the advance of his ground forces. After a day or two, this local superiority was lost and, through the combined efforts of the ground and air forces, the Wehrmacht was forced to consolidate its positions and later withdraw because of the air attacks against its troops, guns, and supplies.

The success of many of our attacks against enemy installations has been predicated on our ability to gain air superiority. This was true in the operations in the Ploesti area. Due to the large amount of enemy territory we had to pass over, it was necessary for us to neutralize the Luftwaffe to as great an extent as possible in order to minimize our losses. Likewise, in our operations in the Pacific it will be noted that the enemy air forces are subjected to intense attacks prior to our landings in order to obtain the air superiority which provides us the necessary freedom of action for our forces.

Having briefly covered the various targets

which are classified as strategic and seen what their destruction will do, let us take a look at the process by which the various targets are selected and allotted a priority. It may seem that this would be an almost impossible task. It does entail a great deal of work, but it is not quite so difficult as it may sound. The process followed in this selection is somewhat as follows:

A special board, composed of industrial and military experts, will gather together all the information which they can find relative to the various industries. This is possible since very few of the large industries were created solely by one nation. Foreign capital has been invested in many of them and foreign labor has been used in their design and development. Therefore, it is almost always possible to find someone who will have a knowledge of what the various plants are like, how they are laid out, and what their construction is. This board will then proceed to evaluate each one of these objectives from the point of view of the effect their destruction will have on the strategic plans laid down by higher headquarters and the vulnerability of each installation to air attack. In some cases the board will even go so far as to recommend the type of bomb and the fuze to be used in the attack. As a result of these investigations the board will allocate to each objective a priority of attack. Finally, after all angles have been considered and studied, the board will make recommendations in the form of reports to the air force commander, theater commander, or the combined and joint chiefs of staff, depending on the level at which the planning is being done.

When we commenced operations against Germany from England, we were partially guided by the list of priorities which had already been set up by the British. As our operations progressed, we found that we would have to readjust some of these priorities to fit the type of operations which we were conducting. As most of our attacks were being made during the hours of daylight, we were subject to severe opposition from the Luftwaffe. This meant that the first

thing we would have to do was to place our main effort against the air force until we had reduced it to such a point that it could not effectively hinder our operations. Our next priority on objectives was placed on gas and oil refineries. By destroying this source of power we would eventually demobilize the German Army and Air Force. Next on the list was the ball bearing industry, and from there on the priorities varied as the situation demanded. From time to time we have had to switch our efforts to certain objectives such as the U-boat pens and factories. When the Germans started using the V-1, we found it necessary to interrupt our normal operations and concentrate on the launching sites for these weapons.

Once the special board has made its recommendations, the staff then proceeds to evaluate them against an estimate of the situation which is available at all times. One of their primary concerns is the logistical factor, but they will also consider the size of the force needed to carry out the attacks recommended. Providing the logistical, intelligence, and personnel factors will permit the attacks to be accomplished, the staff will usually accept the priority and recommendations of the board.

One factor which enters the picture at this time is the political effect of the operations. It was found in many cases that the Eighth Air Force was unable to attack vital targets in the occupied countries of France, Belgium, and Holland because of the possible detrimental effect that would result on the native population. The possibility existed that, if certain targets were hit, large numbers of the natives might be injured or killed. If this were to happen often, it would inevitably turn the natives against us and hinder our operations on the continent at such a time as we could successfully mount our invasion.

Finally, after the objective has been selected and the attack completed, it remains for the ground and the air forces to exploit the results created by these strategic operations.

In the Pacific our rapid progress has accomplished a large degree of neutralization of the Japanese sources of raw materials. Our bases are now located in such a way that we can press home our attacks against the industrial empire on the Japanese mainland. Our B-29's are carrying out extensive operations against the aircraft and steel industries. The outside sources of petroleum have been cut off and are being neutralized by other units of our armed forces.

Thus, when we pick up a paper and read

in it that Tokyo was attacked by a large force of B-29's, we realize that it is not just an idle impulse or hunch on the part of some commander which has caused this attack to be made. It is the culmination of a long and arduous process of evaluation and research on the part of hundreds of people, and was designed to deprive the enemy of some vital matériel or force for the conduct of war. It is a continuation of the strategic plan and another step in the successful and timely conclusion of this plan.

"Dropmasters"

Digested at the Command and General Staff School from an article in
Quartermaster Training Service Journal 4 May 1945.

WHEN news of the dangerous position of Bastogne came through, supply wheels began turning. Immediately, quartermasters stationed at troop carrier bases from which the supplies were to be flown began preparing for the mission. They worked day and night. Hundreds of bundles were wrapped, placed in the special chute containers, and loaded into the planes.

Plans were made quickly for the dropping. First point to be settled was how the pilots were to recognize the exact drop areas. Here was a snag which had caused considerable trouble in aerial supply at Arnhem. There, less than ten percent of the supplies dropped actually reached the Allied troops fighting below. Chief reasons were bad weather and intense low-level flak.

RAF night-bomber techniques were copied. A special "pathfinder" force was selected, consisting of specially trained and highly skilled pilots and navigators. Their job was to pinpoint the precise drop zones (DZ's), indicated by the garrisons below, in advance of the C-47 skytrain.

These "sharpshooters" started out well ahead. After scouting, they found the DZ's, and on these spots dropped paratroops equipped with special visual and radio signaling aids. The paratroopers set up their apparatus. Then the tense moment came.

As soon as they sighted the planes, the paratroopers began operating their signaling equipment. The pilots of the transports didn't have to bother about landscape identification. All they had to do was watch for the ground signals and fly to them.

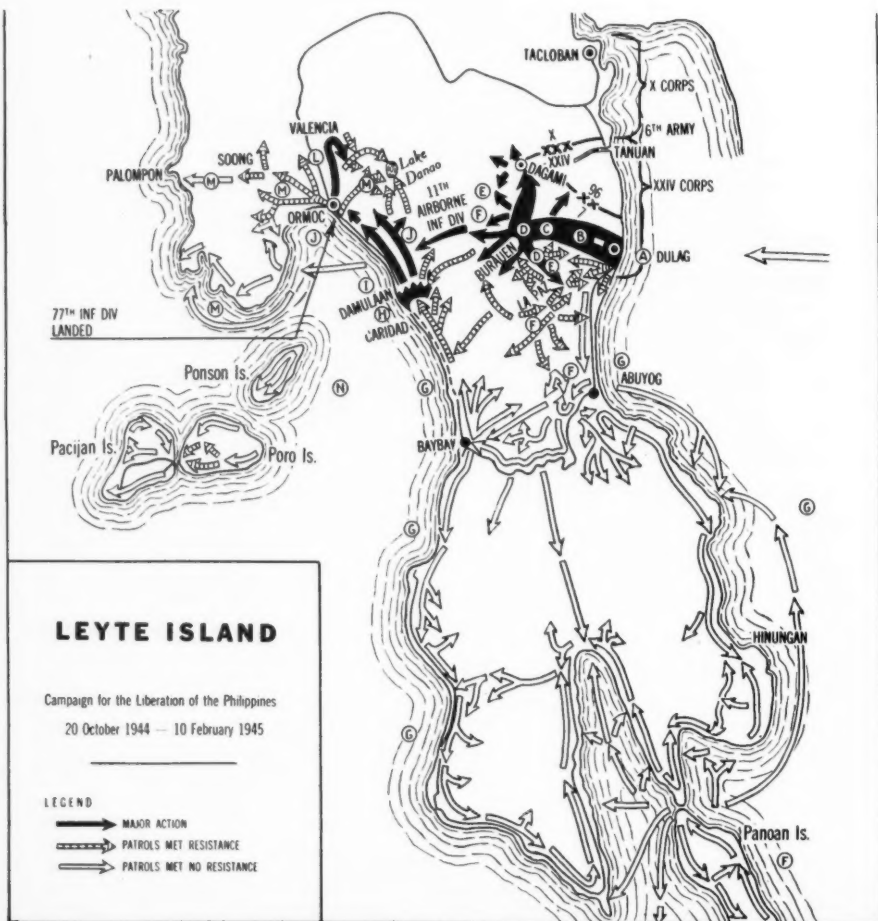
Once over the target, the quartermaster "dropmasters" on the C-47's went into action. Within forty-five seconds from the time the pilot flashed the green light that told the flying quartermasters they were over their target, all the heavy packages were out of the planes.

The containers settled with high accuracy. Less than five percent of all the tonnage dropped missed the tiny DZ's. In fact, so accurate was the timing that some of the ground signaling apparatus was hit by the parachuting cargoes. One paratrooper with six combat drops behind him said that the most dangerous job he had ever done was standing by the apparatus while 300-pound supply containers fell around him.

Altogether, 878 C-47's flew over the target. In all, 807 tons of ordnance, medical and food supplies, plus 348 bundles of equipment, were packed during those vital hours and parachuted to the men below.

The 7th Division in Leyte

A REPORT FROM MAJOR GENERAL A. V. ARNOLD, *United States Army*
Commanding General, 7th Infantry Division



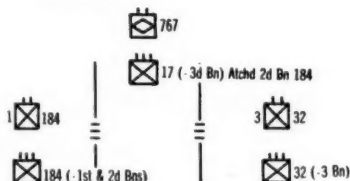
Tactical Operation of the 7th Division in the Battle for Liberation of the Philippines, Leyte, P. I.

MAP KEY

- A. A-DAY, 20 OCTOBER 1944.
Assault landing Dulag.
Formation:



- B. A TO A PLUS 2.
Captured Dulag Airstrip.
C. A PLUS 3 TO A PLUS 4.
Captured Burauen and San Pablo Air-
strips One and Two.
Formation:*



- D. A PLUS 5 TO A PLUS 7.
32d Infantry captured Buri Airstrip.
17th Infantry advanced on Dagami.
184th Infantry moved to La Paz.
Abuyog.
E. A PLUS 8 TO A PLUS 9.
17th Infantry captured Dagami, pushed
west from Dagami, Guinarona, and
Burauen.
32d Infantry guarded airfields.
184th Infantry patrolled from La Paz.
F. A PLUS 10 TO A PLUS 12.
17th and 184th Infantry patrolled into
mountains.
32d Infantry (minus one battalion) to
Abuyog en route to Baybay.
One battalion 32d Infantry re-
lieved RCT, 24th Division,
Panaon Island.

- G. A PLUS 13 TO A PLUS 29.
17th Infantry relieved by 96th Division.
In turn, relieved 96th Division was re-
lieved by 11th Airborne Division.
Regiment (minus one battalion),
Burauen.
One battalion, Tanauan.
32d Infantry (less 1st Battalion) with
Reconnaissance Troop patrolled west
coast Caridad to Sogod Bay.
1st Battalion patrolled Panaon, Sogod
Bay, and east coast to Hinunangan.
184th Infantry reconnoitered east coast
to Hinunangan.
H. A PLUS 30 TO A PLUS 45.
32d Infantry (less 1st Battalion) de-
fended at Palanas River against
elements Japanese 27th Division.
184th Infantry reinforced 32d Infantry
at Damulaan.
17th Infantry followed 184th Infantry.
I. A PLUS 46 TO A PLUS 53.
Division attacked toward Ormoc.
Formation:



- A PLUS 51.
77th Division captured Ormoc.
J. A PLUS 54 TO A PLUS 59.
17th Infantry held Talisayan River Line.
184th Infantry attached to 77th Division
to defend Ormoc.
32d Infantry attacked east to join 11th
Airborne Division advancing from
Burauen.
K. A PLUS 60 TO A PLUS 64.
17th Infantry protected MSR [main
supply road] Ormoc-Baybay.
32d Infantry attacked north to line east
of Ormoc.
184th Infantry defended Ormoc.
A PLUS 65.
Organized resistance declared ended.

*The symbol for the leading element in the center of the formation indicates the 767th Amphibian Tank Battalion.—The Editor.

A-DAY TO A PLUS 65.
10,167 Japs killed.

- L. A PLUS 65 TO A PLUS 69.
184th Infantry attacked north to Valencia.
32d Infantry defended Ormoc.
17th Infantry protected MSR.

- M. A PLUS 70 TO A PLUS 110.
Division averaged thirty patrols per day.
Covered area south of Valencia-Palompon Line.

- N. A PLUS 87 TO A PLUS 108.
3d Battalion, 184th Infantry, reinforced, seized Camotes Islands.

- A PLUS 110, 10 FEBRUARY.
7th Division relieved by elements of Americal Division.

A PLUS 66 TO A PLUS 110.
6,392 Japs killed.

A-DAY TO A PLUS 110.
16,559 Japs killed (total).

A-DAY TO A PLUS 110.
233 Prisoners of war taken (total).

SUMMARY

Total miles covered in coordinated attacks—34.

Total miles moved—110.

Total area reconnoitered—1,950 square miles (68.6%) of Leyte, including Panaon and Camotes Islands.

Total time active fighting—3 months 20 days.

Soviet Underwater Bridges

From an article by Major Robert B. Rigg in *The Military Engineer* March 1945.

THE Red Army has pioneered in the construction of underwater bridges, and, to the author's knowledge, it was the first modern army to achieve success in the combat use of such structures. Actually, some underwater bridges for tanks and heavy vehicles are, in effect, artificial fords. Others, however, are actual log structures built under water.

The true underwater bridges for vehicles are pile-anchored, prefabricated sections made either of plain logs or milled timbers. The sections are assembled upstream a short way from the place where piles are driven into the river. Once the piles are in place, the sections are floated downstream one or two at a time, and swung into position where they are weighted by stones from nearby rafts to submerge them. The next phase is to fasten these sections permanently to the piles, thus securing them to the bottom of the river. This is a difficult underwater job which has never been completely perfected. Methods of fastening vary; clamps, brackets, pegs,

and spikes are used, but they all have their drawbacks. This part of the technique needs improving. It is the Soviet practice to do every bit of prefabricating possible on the shore in order to eliminate the amount of labor and fitting to be done under water. Bridges of this type are usually built up in tiers, although the velocity of the river current will limit the number of tiers. The usual bridge is from four to five tiers. In order to prevent the prefabricated bridge sections from floating below the bridge foundation, guide piles protrude above the water's surface; these piles are spaced at regular intervals along the downstream edge of the bridge. Later they are either sawed off or driven below the waterline. Because of the effect which the current can have on even well-anchored sections of a bridge, constant inspection is necessary. No details are available on the subject, but there is some information to the effect that the Soviets have used special underwater masks for personnel who must perform the underwater fastenings.

Sell Your Field Artillery with Spare Parts and Free Servicing

LIEUTENANT COLONEL E. L. HOOPES, JR., *Field Artillery*
Instructor, Command and General Staff School

FIELD Marshal Montgomery recently has said: "Success [in battle] is bound to be conditioned by many factors, of which I consider the following are the most important:

a. The degree of knowledge possessed by each Service of the other's task, their capacity, and their limitations.

b. The degree of mutual trust and honesty of motive which is reached between the two Services . . . "

This statement was made with particular regard to joint air-ground operations. It is believed applicable in equal force to any two arms or services operating together in the performance of a common mission.

The purpose of this article is to illustrate how a field artillery commander, either personally or through the medium of his staff, can do much to insure the most effective use of antiaircraft artillery, tank-destroyer, and tank units when employed on the secondary mission of serving as additional artillery. The article will also illustrate what assistance antiaircraft, tank-destroyer, and tank unit commanders or staff officers can render to the artilleryman. This exchange of assistance between representatives of these separate arms demands the degree of knowledge and the degree of mutual trust to which Field Marshal Montgomery referred.

As World War II continues, primary missions for antiaircraft, tank-destroyer, and tank units are becoming increasingly scarce. The decided decrease in enemy air strength has already dictated the conversion of certain antiaircraft artillery units; present and future reductions in the strength of enemy armor will decrease the need of tank-destroyer employment on antitank missions; and, as the earth's terrestrial battlefield continues to be diminished in size, suitable terrain for utilizing independently the shock action of our own tanks will become increasingly difficult to obtain.

Such an overall picture brings up the

question: "What use can be made of anti-aircraft artillery, tank-destroyer, and tank weapons where their employment on their primary mission is imprudent?" One answer might be to hold them in reserve until a favorable situation does occur. Another solution might be conversion to the most needed type of unit, probably infantry. A third possibility is the one to be considered in this article, namely, their employment as additional field artillery. Such employment is not a new idea by any means. Our commanders in the theaters have already used certain of these units in just such a role.

Let us assume for illustrative purposes that the 11th Infantry Division committed to action in X Theater of Operations has among its various attachments the 701st Antiaircraft Gun Battalion, Mobile, the 802d Tank-Destroyer Battalion, Self-Propelled, and the 903d Tank Battalion. The special situation on the 11th Division front has reached the point where either the nature of enemy opposition or the employment of organic and other attached units (augmented by additional antiaircraft and tank-destroyer support from corps) has caused the division commander to attach all three of these units to the division artillery.

To justify its employment on the battlefield, field artillery must be able to shoot, march, and communicate. In order to be capable of performing these three "musts," many specific related problems crop up in the mind of the artilleryman. Of these, let us consider only the following: matériel, communication, observation, gun (howitzer) positions, ammunition, control, and fire direction. In a situation involving only field artillery personnel and equipment, the solution of these problems requires thought, time, and cooperation among artillerymen. In a situation such as we have assumed for the 11th Infantry Division artillery and its three attachments, certainly no less thought, no less

time, and much more cooperation between the supported unit and its attachments will be required.

Let us begin our discussion of this exchange of assistance by considering matériel. How much additional artillery is the 11th Division artillery receiving from each of these battalions? One method of obtaining the answer to this question would be reference to the appropriate Tables of Organization and Equipment. A better method, in view of possible battle casualties in matériel and also in view of frequently changing Tables of Organization and Equipment, would be by means of a staff conference. By either method, the division artillery commander could obtain the following information: (1) The 701st Antiaircraft Gun Battalion, Mobile, is equipped with sixteen 90-mm antiaircraft guns divided equally among four batteries. (2) The 802d Tank-Destroyer Battalion, Self-Propelled, has thirty-six motor carriages, M36, each equipped with a 90-mm gun; twelve of these weapons are present in each of three tank-destroyer companies, and within each company there are three four-gun platoons. (3) The 903d Tank Battalion has fifty-four M-4 medium tanks each armed with a 75-mm gun; of this number, forty-five is probably the maximum number which would be available to fire as field artillery, the remainder being command tanks; these forty-five available are divided among three companies, fifteen in each company; each company is further capable of subdivision into three platoons of five tanks each. In addition to these 75-mm guns, it is also possible to form from tank-battalion weapons a six-howitzer battery of 105-mm howitzers. This can be done by taking one such tank from each of the three medium tank companies and combining them with three similar tanks found organically in the tank battalion headquarters company. Summarizing the available armament in these three attached units, the division artillery could obtain from the antiaircraft gun battalion, four batteries, each consisting of four 90-mm guns; from the tank-destroyer battalion, nine batteries, each consisting of four 90-mm

guns; and from the tank battalion, nine batteries, each consisting of five 75-mm guns plus one battery of six 105-mm howitzers. It is evident that any one of these organizations would constitute noteworthy assistance to any artillery organization. The assumption previously stated of having all three battalions attached to our division artillery is not meant to be indicative of any specific battle situation. It is made only for purposes of explanation and comparison. Actually, a division so far in this war would have been more likely to have received the attachment of just one or two of these battalions and then have been able to make only one or two companies or batteries available as additional field artillery.

The second subject for consideration is communications. The primary means of communication of an antiaircraft gun battalion is wire; of a tank-destroyer battalion and tank battalion, it is radio; and of artillery in an infantry division, it is also wire. The simplest means of exchanging this information would also be a conference of commanders or staff officers. At the same conference, our field artillery representative could inform the representative of each of these units that wire communication between the division artillery switchboard and the attached unit will be installed and maintained by the division artillery. Also, wire communication required between the attached unit's battalion switchboard and each of its firing batteries (companies) is normally a unit responsibility. In the case of the tank destroyers and tanks, this will also usually include at least one and preferably two circuits between each company fire-direction center and each firing platoon. In the event one unit commander or staff officer states that he does not have that much wire on hand in his battalion, once again the field artillery representative can assist by stating that the division artillery communications officer and S-4 will make excess artillery wire available. Should even this be insufficient, the division artillery commander will request additional wire from the division signal officer.

Now what about observation? Here again

the field artillery must offer assistance. The tank and tank-destroyer battalions both possess reconnaissance personnel who can serve as ground observers when their unit is functioning in this secondary role. However, in order to coordinate the location and observation of all field artillery observers, our field artillery commander or staff officer must tell them in what sector to observe and possibly with what other field artillery unit to establish one or more joint observation posts. This joint observation post setup would have the advantage of giving the attached unit a field artillery adviser to assist its own observer in the attack of targets using indirect fire. The antiaircraft gun battalion is an entirely different arrangement because the battalion has no ground observers. Consequently, some field artillery observer will be required to handle all observed fire missions of the antiaircraft battalion. The extensive field artillery communication system will readily permit such an arrangement. The antiaircraft battalion must be so informed.

Next let us consider position areas. The staff officer (commander) of each of our attached battalions is familiar with the type of position normally occupied by his unit when performing its primary mission. However, he is no doubt somewhat less familiar with the characteristics desirable in a field artillery position. Consequently, here again a mutual exchange of information between commanders or staff officers is required. The field artilleryman knows where the bulk of the fire from these attached units will be desired. The specialist (antiaircraft artillery, tank destroyer, or tank) knows the trajectory of his weapons. With range and trajectory being so interrelated, the most desirable result is *general designation* of position areas of attached units by the field artillery commander. *Detailed selection* of actual battery (company) (platoon) firing positions is left to the attached unit commander.

A firing weapon without ammunition is of no value. Such a conclusion causes an artillery commander to take action to ensure the value of both his organic and attached units.

In this situation, the commanding general of the 11th Division artillery would have three considerations concerning ammunition for the attached antiaircraft artillery, tank-destroyer, and tank battalions. First, he must estimate what quantity of ammunition will be expended by these attachments during the coming action. Second, he must ascertain whether ammunition credits for these units will be made available by corps in sufficient quantity to support the estimated expenditure rate; if not, he may have to revise his estimate. And, finally, he must consider whether or not the attached units can transport in their own transportation the quantity of ammunition allocated and required. If the amount is beyond their capabilities, he must either reduce the expenditure rate to a figure commensurate with their hauling capacity, allot them some of the organic field artillery ammunition supply vehicles, or obtain the necessary additional transportation elsewhere. This ammunition supply problem is another example of the need for knowledge of the capacities and limitations of a cooperating branch of the service. Exaggeration of either capabilities or limitations would violate the mutual trust and honesty of motive described by Field Marshal Montgomery as essential to success.

The next major point of concern to the "gunner" was that of "control." Until recently, this subject would probably have given an antiaircraft artillery, tank-destroyer, or tank unit more difficulty than any other phase of serving as additional field artillery. Actually, with the proper fire control and survey equipment, with which all such units are now being equipped, it is very simple. What is the artilleryman trying to obtain when he seeks "control"? Nothing more than the relative location on a firing chart of at least one gun (howitzer) in each of his batteries with respect to a point or points in the target area. It may be obtained in several ways, such as by inspection, by registration, by survey. In every situation, regardless of its speed, the artilleryman constantly seeks to improve his "control." This means that the goal for which he strives is

either a complete grid sheet survey of both position and target areas or at least some type of map, showing both these areas, which has been corrected by survey. Who does the surveying? Personnel in every field artillery organization from corps artillery headquarters down to at least each battalion, very often to each battery. The desirability of accurate massed artillery fire requires that sooner or later all survey be coordinated. How is this coordination effected? By having a higher headquarters such as corps artillery give a lower headquarters such as division artillery a point of known location and elevation (and from that point a known direction) from which to start its (the subordinate unit's) survey. At least two points, one in the target area and one in the position area, are more desirable. In the case of attached units, however, such as our antiaircraft artillery, tank-destroyer, and tank battalions, no target area surveying is required or expected. The parent field artillery (in this case, the 11th Division artillery) is responsible for all target area control. In the position area, these attachments must be prepared to survey as artillerymen. Specifically, if and when 11th Division artillery gives any one of these units a point and a direction with which to start its survey, that unit must be able to locate its battery (company) (platoon) positions accurately both horizontally and vertically with respect to that point. Eventually, that "must" will be one with which compliance is easy. However, it may remain difficult in our theaters until the state of training and issue of equipment is more complete. Until such occurs, the artilleryman can once again assist the supporting unit to accomplish its mission. The voluntary loan of both survey personnel and equipment will do much to solve the problem.

Since the development of the publicized massed-fire field artillery technique, many artillerymen think in terms of fire-direction centers. Fire-direction center computation is an application of simple mathematics capable of improvement with practice. In this respect, also, training and receipt of fire-direction equipment will have a definite bearing on

how much assistance a non-field artillery organization will require. An antiaircraft gun battalion, such as our 701st Antiaircraft Gun Battalion will have to furnish the personnel and equipment to operate a battalion fire-direction center. A tank-destroyer battalion or a tank battalion such as our 802d Tank-Destroyer Battalion and our 903d Tank Battalion, will each have to provide a battalion fire-control center in addition to a company fire-direction center. This is necessary because each company with its three platoons of either six (tank-destroyer) or five (tank) guns is comparable to the field artillery battalion organization. Experience has demonstrated that a fire-direction center is desirable for each field artillery battalion. Particularly in the case of tank destroyers and tanks, this fire direction setup requires a quantity of trained fire-direction personnel. In the event training or equipment has been lacking, once again the field artillery should offer all possible assistance by necessary loans. Aside from the training and equipment angles, it will be normal for the supported field artillery organization (in this case, 11th Division artillery) to relieve the supporting unit of much of the command responsibility of fire direction. The field artillery commander or his representative in his fire-direction center will usually designate targets to be attacked, time the fire is to be delivered, and the number of rounds to be fired.

In conclusion, it is possible that the day may come when tank-destroyer battalions, antiaircraft-gun battalions, and tank battalions may be capable of superior, unassisted performance of the field artillery role. This, of course, will depend on the training and equipment of these organizations. Until such training and issue of equipment is accomplished, the field artillery organization supported by either the attachment or reinforcement of these units can do much to bridge the training and equipment gap. Much has been written about the salesmanship necessary to make the arms supported by field artillery "artillery-minded." In the case of antiaircraft artillery, tank-destroyer, and

tank battalions, such education is not necessary in the same sense because the very nature of their weapons causes them to be "specialist" or "direct-fire" artillerymen. Instead of the infantry type salesmanship, this transaction is similar to one aspect of the pre-war sale of an automobile. Included in any such sale would have been a free 1,000-

mile inspection, a set of tools, a spare wheel and tire, and a grease and oil change. In other words, when your customer is a member of an antiaircraft artillery, tank-destructor, or tank organization, sell your field artillery with spare parts and free servicing. Such a sale would subscribe to Field Marshal Montgomery's formula for success.

Bearing a Burden

Released by the Director, Maintenance Division, Army Service Forces.

BALL and roller bearings are carrying the war to the enemy on trucks, tanks, tractors, trains, planes, and ships. And bearings are just about number one when it comes to critical items used in the Army.

Three main points in the care and handling of bearings should be kept in mind at all times. First, keep bearings clean! Remember that sand or grit will score a bearing in short order—a few drops of moisture will rust it just as quickly. So keep bearings wrapped at all times when they are not in use, and when installing or removing them always place them on *clean* surfaces. The dry-cleaning solvents you use to clean them and the lubricants you use to keep them running smoothly must be clean too. For this reason it is important that containers be kept covered as much as possible to prevent dust and grit from settling and blowing into them. Hands, benches, rags, tools—everything that touches bearings—must be clean.

Second, keep bearings adjusted properly. This is especially important in operation of motor vehicles where removal of front wheels for lubrication is a frequent occurrence. Reinstallation of bearings at times like these, or installation of new bearings when necessary, must be performed carefully so that bearings are neither too tight nor too loose. A bearing that is too tight will overheat quickly and a bearing that is too loose will be subjected to jolting and jarring far in excess of its ability to withstand. Bearings are shock breakers, not shock takers.

Lubrication is the third important maintenance service in the care of bearings. War Department Lubrication Orders for specific items of equipment should be followed so that the right lubricant in the right amount is always applied. Here, again, the cleanliness of lubricants must be emphasized and the practice of keeping lubricant containers covered whenever they are not actually in use must be stressed.

In connection with second, third, and fourth echelon handling and reclamation of bearings, a new technical manual, TM-2856, "Maintenance of Ball and Roller Bearings," is now in the process of preparation for distribution in the near future. This manual gives special attention to inspection procedures in connection with determining whether bearings are serviceable or unserviceable. It would be well for personnel responsible for this phase of bearing maintenance, especially, to watch for the appearance of this manual, though of course, everyone who handles bearings will find the manual of interest and help.

It takes just as much, if not more, equipment to win a war as it does to lose one. So the fact that we are winning many victories as the days pass does not mean that we can let up on our efforts to make our equipment last as long as possible and give the utmost in efficient service. Bearings are small in size, but they are big in importance. Give them the attention they deserve—keep them clean, keep them adjusted properly, and keep them lubricated—to keep them rolling.

A Cure for Shipside Confusion

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DURING the early days of this war a certain transport arrived at one of our major ports with some 300 passengers on board impatiently awaiting the dropping of the gangplank. On the dock an equal number of personnel eagerly awaited an opportunity to board ship to welcome them, or to assist in the debarkation. It might be expected that such a situation, unless closely regulated, would lead to confusion. It did. As a result, it was decided to eliminate the crowd on the pier by admitting only such persons as were essential to the operation and then only when called for by the Troop Movement Officer. The latter was directed to conduct the debarkation in accordance with the procedure outlined in the memorandum below. The procedure outlined therein has been in operation

for several years and has proved a most effective remedy for the situation cited.

The reader will no doubt be surprised by the heading of the procedure, which has been amended slightly to conform with a recent War Department directive. Because port operations vary between ports as well as from time to time within ports, we here at the school have adopted for instructional purposes a hypothetical port known as the Leavenworth Port of Embarkation and have located it on Chesapeake Bay below Baltimore. By so doing, we have been able to teach the principles of port operation at a typical port without harassment by the variations existing in the field. The procedure as used in this school follows:

ARMY SERVICE FORCES Leavenworth Port of Embarkation Chesapeake, Md.

DEBARKATION MEMORANDUM }
No. 23 }

11 November 19—

DEBARKATION PROCEDURE

1. The following will serve as a general guide to govern debarkations.

a. *Boarding Party* (Boards ship as soon as possible).

Troop Movement Officer

(1) Contacts Transport Commander and obtains passenger list; advises Transport Commander method and order of debarkation. Gives welcoming address to RO & TD Groups.

Port Surgeon

(1) Clears ship per AR 30-1245; notifies TMO to proceed; arranges details for debarking sick and wounded.

EM Medical

(1) Clerk

Naval Boarding Officer

(1) Interviews survivors.

Naval Logistical Officer

(1) Arranges interrogation of civilians.

Total

5

b. *Following details board ship when docked, in order named:*

(1) Customs Inspector
Immigration

(1) Secures declarations on baggage.

Inspector
Baggage Master

(1) Arranges to inspect civilians.

(1) Effects transfer baggage from ship to dock.

Debarkation
Officer

(1) Reports to TMO; issues such instructions as may be necessary to accomplish orderly debarkation and control of passengers.

Total

4

(2) MP Detail:

NCO

(1) Reports to TMO for instructions.

EMs (as directed
by TMO)(3) Medical attendants
(As required)

Relieve attendants provided by CO of Transport. (Report to Port Surgeon.)

(4) Balance Navy Logistical Party:

Control Officer

(1) Sets up panels for interviewing civilians.

Operations Officer

(1) Sets up panels for interviewing civilians.

EM Navy

(1) Clerk.

Total

3

c. Prisoners of War first to be debarked.

d. Service personnel debarks in the following order:

- (1) For duty.
- (2) Ambulant sick.
- (3) Mental cases.
- (4) Litter cases.

Note: EMERGENCY HOSPITAL CASES TO BE EVACUATED AS DIRECTED BY TMO
(Troop Movement Officer).

e. Following board ship on completion of debarkation of service personnel, on call of TMO:

(1) Intelligence Panels:

Army
Navy
FBI
Immigration

Panels for interviewing and clearing civilians for debarkation.

(2) W. S. A. Representative

Arranges transportation details for merchant seamen.

(3) Red Cross Representative

Handles Red Cross personnel. Arranges transportation details for other civilians when called upon by TMO.

f. Civilians debark in following order:

- (1) Hospital cases
- (2) Other

Names and place of hospital to Navy Intelligence.

Director Troop Movement Division.

DISTRIBUTION:

Special.

I say, then, that when you have gained a victory, you ought by all means to pursue it, and to imitate Julius Caesar rather than Hannibal in that respect; the latter of whom lost the empire of the world by trifling away his time at Capna, after he had routed the Romans at the battle of Cannae. Caesar, on the other hand, never rested after the victory, but always pursued and harassed the enemy after they were broked and flying, with greater vigor and fury than he attacked them at first.

—Machiavelli, *The Art of War*

The Pillbox--A Trap

LIEUTENANT COLONEL JOHN E. KELLY, *Infantry*
Commanding Officer, 3d Battalion, 378th Infantry

Major General Harry L. Twaddle, Commanding General, 95th Infantry Division, in his letter of transmittal of this article to the editor, stated: "Colonel Kelly is an authority on the subject of pillbox fighting, having had several weeks' experience in reduction of the defenses of the Siegfried Line in the bridgehead which the 95th Division gained at Saarlautern, Germany. Throughout this Division, we put into practice the methods which he has very ably explained in his article. Pillbox fighting is a specialty; there is no doubt about that."

—THE EDITOR.

PILLBOXES are traps, tombs from which there is no escape for those who elect to remain and fight from within the false security of their walls. Perhaps this reads a bit differently from the usual remarks on German bunkers, but having successfully reduced every pillbox we have assaulted, we would much prefer to attack them than to defend one.

True, they offer more protection than the foxhole and are usually strongly manned and armed, yet from the viewpoint of the attacker, there are some advantages in fighting them. For example: All pillboxes have certain characteristics in common. They all have an entrance and usually *only one*. This, in itself, means there is but one route of escape for Jerry. Cover it and he is trapped. Another general feature of all pillboxes is the firing embrasure or port. On the whole, these are points of weakness, as I shall show later. Moreover, Siegfried bunkers are made of concrete. This gives the occupants a false sense of security, which in *any* military operation facilitates the attack.

Considering the above-mentioned similarities among pillboxes, one might believe that they are all alike. This is not true! In the Siegfried Line we encountered two general classes of bunkers. The "embrasure" type (Figure 1) whose fire power is delivered

from one or more openings in the walls, and the steel cupola pillbox (Figures 2 and 3) which has only the turret exposed, the rest of the pillbox being covered by a large mound of earth. The former more readily lends itself to camouflage—in towns as a garage, shed, small house, or band stand, and in the countryside as a haystack or dirt mound. The latter, however, is the stronger. With good fields of fire in all directions, it has no blind spots and presents a most difficult problem to the attacker.

What are the means of defense open to the Germans for protecting these pillboxes, and how can we overcome them?

First, riflemen usually occupy trenches around the bunker to keep our assault parties from infiltrating unseen and unmolested. Our concentrated artillery and mortar fire generally deals with the problem successfully, driving this security group into the relative safety of its box. Moreover, with his own men under cover now, to discourage us from attacking, the defender will probably place artillery fire on the pillbox. This can best be combated by (a) feints on other bunkers, which will cause the enemy to divide his support fires among many areas, and by (b) counterbattery fire on previously determined or suspected Jerry artillery and mortar positions.

Sometimes the Germans lay mine fields around their bunkers. Reconnaissance should determine the presence or absence of such a field. Engineers probing or a Bangalore torpedo crew with the assault team can usually breach a path through the field. Artillery fire usually disrupts any casual mines in the area, though this is not a sure method to clear a field.

The principal difficulty in reducing pillboxes lies, however, not in the bunker itself, but in the supporting fires which protect it against assault. The neutralization of these weapons is the toughest problem confronting the attacker. The best solution is to fight fire with fire. With this in mind, all possible fire power

is placed on the known and suspected localities of enemy resistance. None of the weapons at the disposal of the attacker should be overlooked. Tank destroyer and antitank fire should be placed on the more formidable bunkers supporting the objective, while machine guns and small-arms fire of all types, in addition to mortar and light artillery, should be directed on *all* target areas. Heavy artillery, such as the 8-inch and 240-mm howitzers,

target absorbed five direct hits and hardly showed the effects at all. Against this same box, some fifty rounds of 90-mm TD fire was directed without registering a dent in it. In the same area we registered hits with 8-inch howitzers on another box of this type without visible results. They are really tough nuts to crack.

Thus far the means at hand to isolate the small battlefield around the objective have

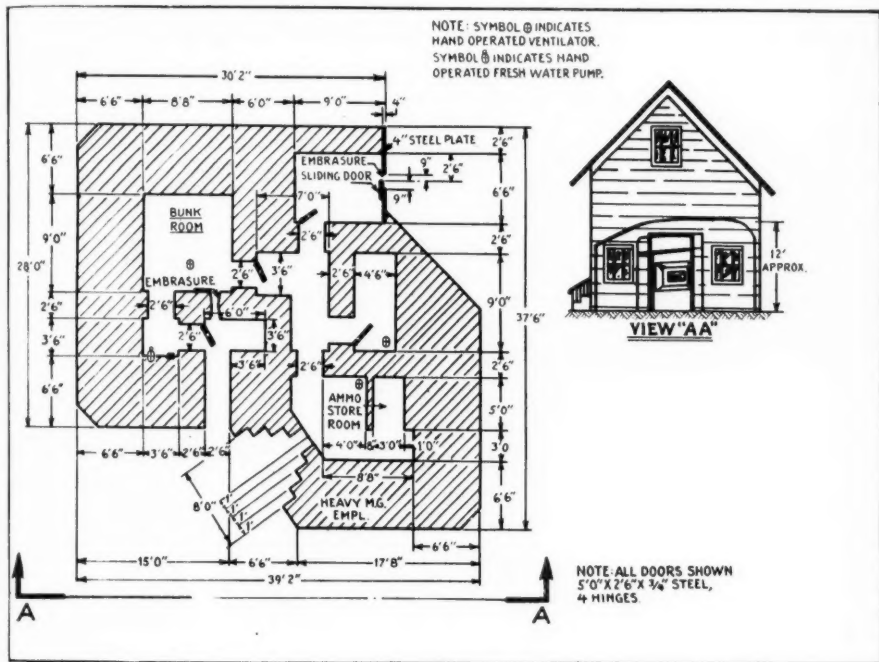


FIGURE 1.
PILLBOX CAMOUFLAGED AS TWO-STORY BUILDING.

if available, can be effectively employed, pinpointing the strongest pillboxes. The fire from these guns usually encourages the occupants to leave the firing chambers and descend to the bottom of their shelter where they are impotent. However, don't rely on heavy or medium artillery to destroy a steel turreted pillbox. On one occasion at Ens Dorf, Germany, we rolled a 155-mm "Long Tom" to within 800 yards of a menacing steel cupola. The

been discussed. However, the isolation of the objective is not its reduction. The attacker must force the defenders to surrender. This will probably call for a close-in assault, though sometimes fire power alone will suffice. In any case, we always try to place a 90-mm, 75-mm, or even a 57-mm gun in position to fire on the bunker from close range. When we obtain penetration and put smoke shells into the bunker, the occupants often come out,

Hände hoch. If they don't surrender of their own accord, we broadcast to them through a public address system to tell them to give up. Incidentally, this has saved us many lives, often persuading Jerry to surrender without our men making costly assaults.

Frequently, however, the above means do not gain the desired results and so the assault

whatever additional strength the commander of the assault group deems necessary to protect the operation from small counterattacks and other developments. The demolition crew should be large enough to carry the necessary explosives to destroy the box, once it has been captured.

In order to neutralize any fire that may

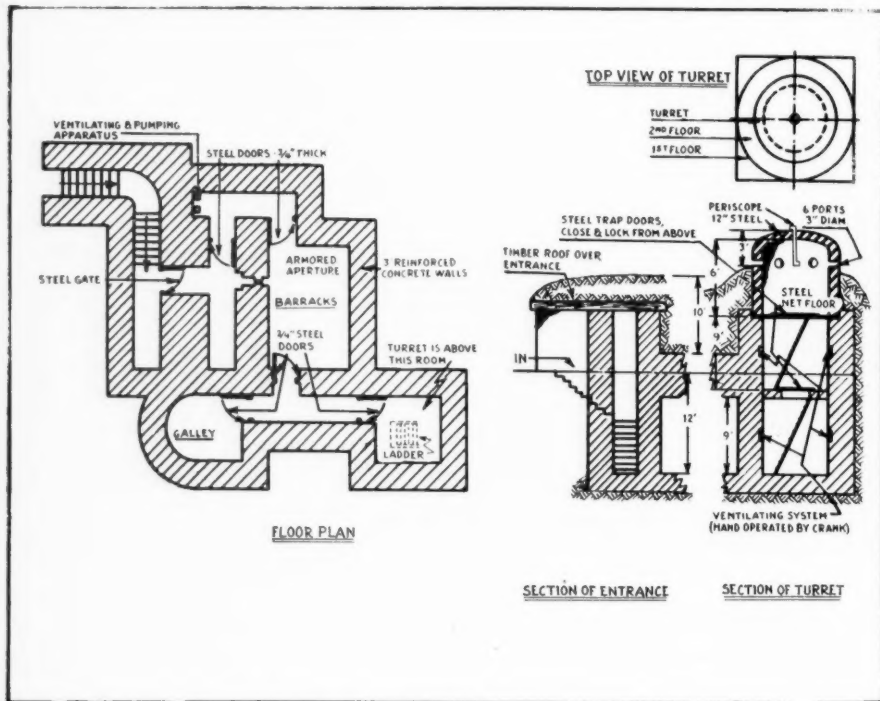


FIGURE 2.
SKETCH OF MEDIUM PILLBOX

is in order. The assault groups will vary in size, depending on the situation. It will generally consist of the assault teams, the support and security group, and the demolition crew. The assault teams should contain a leader, some riflemen, and at least one man carrying the charge to breach the bunker. The minimum number that can accomplish the mission should be employed. Don't expose a platoon where half a squad will succeed. The support and security group should consist of

come from the bunker or from fire trenches protecting it, the assault team must carry a large proportion of automatic weapons. We have found that BAR's, submachine guns, and automatic carbines are particularly valuable for this work. We have also used flame throwers in this capacity. All the members of the party should carry smoke and fragmentation grenades for use against enemy resistance, both inside and outside of the box. Moreover, there should be at least two such

teams—one as a substitute for the other, should the unavoidable and *expected* need arise.

Before the assault on the bunker is made, plans must be laid and carried out to "button up" the embrasures and firing ports from which it may protect itself. Usually this task is assigned the support group which, from its close position to the box, may be able to pour withering fire into these openings, forcing the occupants to close up the trap completely in order to save themselves. This fire is lifted when the assault team masks it, at which time the latter takes up the neutralization of these defenses. When the engineer with the charge signals for the fire to be raised, he rushes in and places the explosive at the point selected for breaching.

Which should be used in such an action—a satchel charge or a "beehive"?* We have employed both with success. The main difficulty in using a "beehive" is that it must be placed more carefully than a satchel charge or it will be of little value. However, when it *can* be properly positioned, as in an embrasure, it is generally more effective than a satchel charge of the same weight. On one of our night operations against pillboxes we placed a thirty-five pound "beehive" on the top of a steel cupola. A satchel charge would have been ineffective, but the "beehive" drove a hole into the turret, splattering molten steel in the inside. On the other hand, we have assaulted pillboxes where it was impossible to place a "beehive" properly. In these instances, satchel charges were effectively employed. We have pushed them, attached to poles, into otherwise inaccessible positions. Standing on the top of turreted pillboxes, we have swung satchel charges attached to the end of some telephone wire into the entrances of the pillboxes, blowing in the doors. However, I believe that, where they can be placed correctly, "beehives" should be used.

The bunker should be breached where it is

most vulnerable—where the concrete walls are not so thick. There are two weak points to all pillboxes, the entrance and the embrasure or firing port. Where there are embrasures (there are none in the steel turret-type box), we believe that the charges should be placed against them rather than against the door, for these reasons: (1) The door is usually covered by fire that is "zeroed" in on it from boxes to the rear. (2) After breaching the door, one must break down other doors closing off the narrow corridors inside the box to get to the defenders in the firing chambers. These doors usually are covered by fire from small ports facing them. (3) And of course most of the defenders are in the firing compartment, and so, when a charge placed at the embrasure explodes, it kills or stuns most of the occupants.

After the box has been breached, the assault team should toss in smoke and fragmentation grenades to inflict further casualties on the defenders.

At this time, it is necessary to wait some five or ten minutes for the smoke and dust to clear before attempting to enter the box through the blown opening.

Whenever possible during this period we employ a public address system to inform the occupants of their position and to warn them to leave the box or die. When a public address system is not available, a German-speaking soldier can call out the pertinent instructions. If a prisoner is available, we usually send him to influence the defenders to surrender. We take all these steps, not from any heartfelt sympathy for the Jerries in the pillbox, but to save possible casualties among our own men. Generally, the "supermen" quit at about this time—those that can still walk coming out of the bunker with great alacrity.

However, the few times we have had to assault the interior of the box, we have been successful, adhering to the tried and true principle of fire power. We pour all the fire we can into the box and sweep from room to room, killing all the "diehards."

This entire operation, when properly planned and executed under the best conditions, will take from ten to twenty minutes.

* The satchel charge derives its name from the fact that it is carried in a cloth bag with a carrying strap. The "beehive" charge resembles a beehive in shape. The effect of a satchel charge is that of an ordinary explosive charge, while the "beehive" charge is a shaped charge giving more penetration in the direction in which the base points.—THE EDITOR.

The best conditions, however, rarely prevail and the inevitable and *expected* difficulties arise. Naturally, it will take longer than twenty minutes when charges do not blow, communications "go out," key men are hit, or German supporting fire has not been completely neutralized. The best solution to these and other contingencies is to *expect* them and be prepared with alternate plans, teams, leaders, and explosives.

The job has not been completed, however, until the bunker has been made unserviceable for future use. There are a number of ways to accomplish this. We can seal off the entrances by melting the doors to the box with thermite grenades. This is not the best solution, for if we abandon the boxes and Jerry can get them, all he need do to re-enter them is to melt the welding and remove the doors. Another way to seal the entrances is by shoveling dirt over them. Tankdozers can often accomplish this quite effectively, but here too, if the opportunity presents itself, the enemy can dig his way in and once more defend the box. We believe the best method for denying captured boxes to future use by the enemy is to demolish them. It normally requires some 700 to 1,000 pounds of TNT to destroy a German bunker completely. It does no good merely to crack them, they must be converted into a pile of rubble. This we do!

The German Army believed that pillboxes were the answer to the defense; that to attempt to crush them would prove too costly for the attacker. Instead, they have been crushed, and each one that was defended has proved to be a trap for the Germans inside. I do not mean to imply that it is easy to capture and destroy a pillbox. On the contrary, it is a most difficult operation requiring careful reconnaissance, planning, and execution.

In Fraulautern and Ens Dorf, Germany, fortified towns in the industrial Saar Valley, we had many experiences attacking pillboxes of all types in the Siegfried Line. There is no one way to prescribe for the reduction of enemy bunkers. However, the following detailed account of the actual reduction of a pillbox underlines the application of the general principles discussed above:

During the first part of January 1945, my battalion was protecting a bridgehead over the Saar River near Saarlautern, Germany. Our mission was to maintain an active defense and knock out any German pillboxes that menaced the bridgehead. One of these bunkers, No. 337, continued to be a thorn in our side. So on about 5 January we decided to capture and destroy it. The operation was set for 7 January. Reconnaissance was immediately initiated to determine the shape, size, and defenses of the objective. All this information was obtained prior to the operation against the box a couple of days later.

Not controlling the buildings (Row "A") paralleling the river nor the pillboxes protecting its bank (see Figure 4), we decided to neutralize both by occupying the houses, and from there, covering the rear of the bunkers. Hence, we pushed out the next day against the block of buildings and by 1700, after scattered resistance, occupied the entire row. From positions in these houses we also planned to direct fire on areas not under our control to the north and east of our objective. In addition, the night before the assault, we occupied the houses immediately northwest of the objective to secure the closest possible point from which to "jump off."

The fire plan for neutralizing German supporting positions called for light and medium artillery at H-hour to drive to cover all Germans in fire trenches. The artillery kept continuous harassing fire on trenches in the area during the assault, and in addition, the largest supporting pillbox on the ridge to the east was taken under fire by an 8-inch howitzer. At the same time, a screen of smoke blanketed the entire area, concealing from possible observers the exact location of our operations and preventing aimed fire from being directed on the assault team after its discovery. It was planned that smoke pots and 4.2 mortars would be used for this but the wind conditions were unfavorable with the result that four of our 81-mm mortars had to be employed to complete the screening. The other two 81-mm mortars and all the 60-mm mortars in the battalion were used to thicken the artillery fires. At this time too, riflemen and a platoon

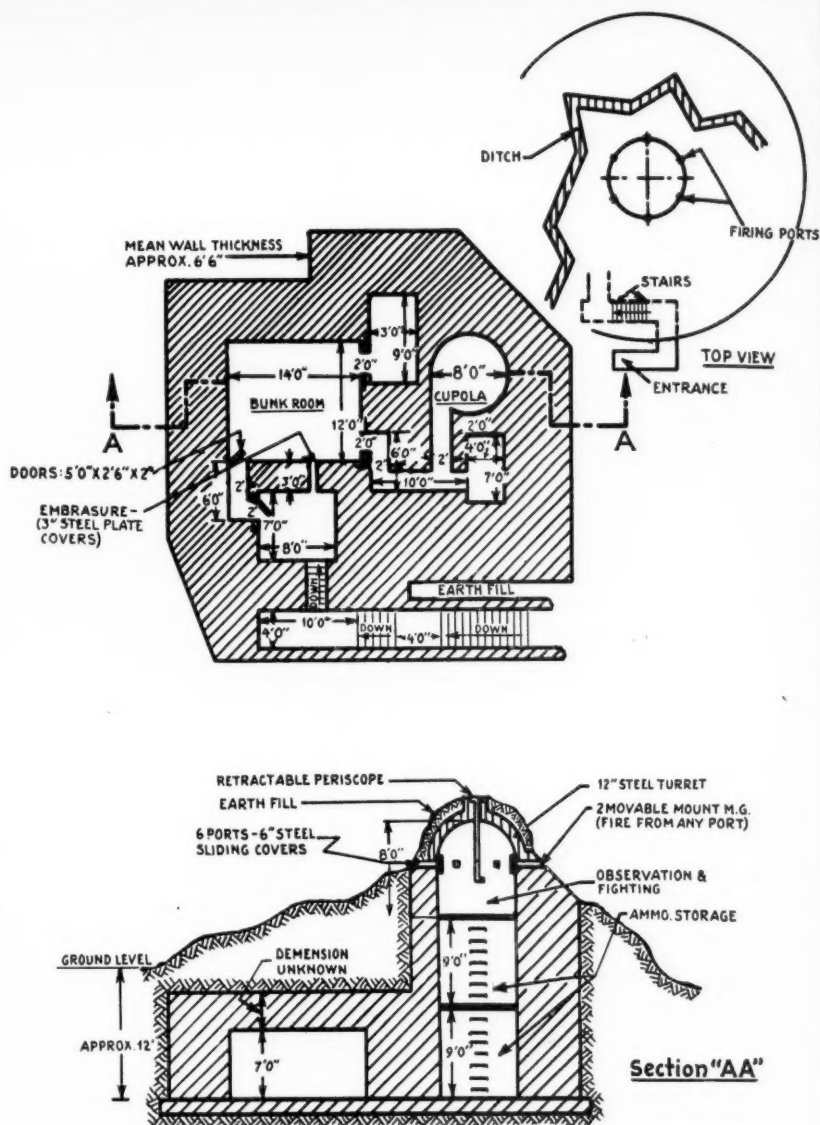


FIGURE 3.
OBSERVATION TYPE PILLBOX.

of machine gunners in the buildings north of the objective fired on known and suspected enemy locations to the south and east. Two other platoons of riflemen and machine gunners in the newly occupied river block fired on houses and pillboxes to the north and east. A platoon of tank destroyers placed direct fire on the pillboxes to the south and east of

Yet in spite of the fact that for communication between the assault group's position and the battalion observation post we used two SCR 536's, two wire lines, and an SCR 300, we had to rely on runners at one time in the operation because we had no other contact.

At H-hour one tank destroyer (90-mm) fired on the objective and pierced the wall

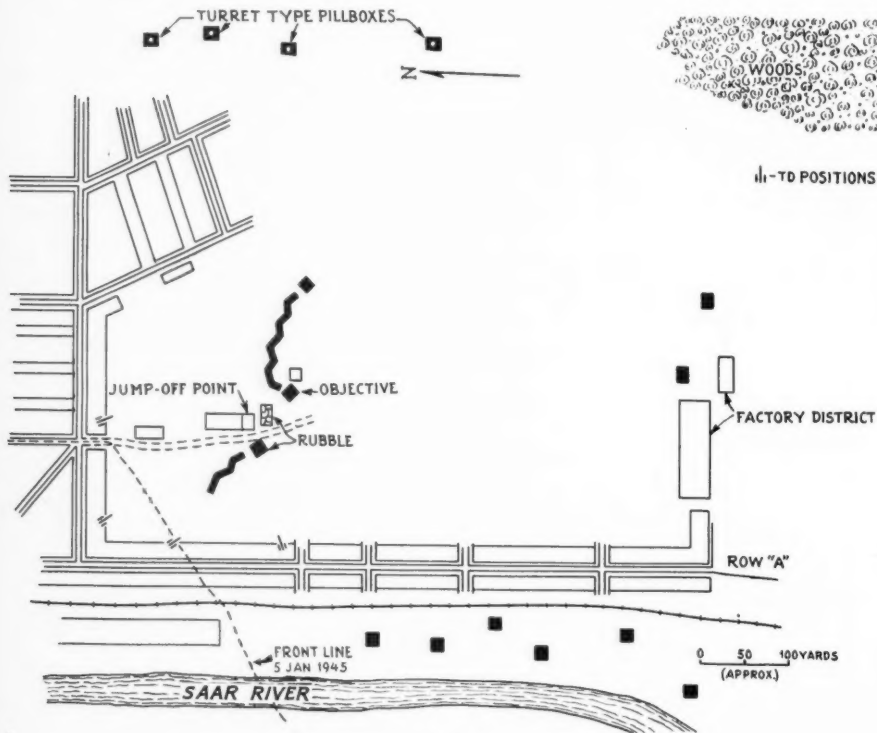


FIGURE 4.

our objective. Thus all the supporting positions were neutralized by large and small-caliber, direct and indirect fires.

The assault platoon was organized at the "jump-off" point into a security and support group, a demolition crew, and two assault teams. We tried to foresee all contingencies, preparing more charges, fuzes, personnel, and equipment than we thought we would need.

with five rounds. Then, using a public address system, we called on the defenders to come out. Receiving no response, the assault team, consisting of two men with BAR's, two men with submachine guns, and one engineer with a beehive, under the cover of supporting fires, attacked the box, placed the charge, lit the fuze, and withdrew. But at this time the operation ceased to proceed according to plan.

The charge did not explode and a chance "round" killed the assault engineer. The assault group, however, immediately readied itself to "hit it" again and lost no time jumping off when they received the word from the battalion observation post which was co-ordinating the supporting fires and the assault. The second team attacked the box, set the charge, and blew a hole into the embrasure. They then returned to the bunker, threw grenades into the opening, sprayed it with automatic fire, and returned to the jump-off position (it being unhealthy to remain around a German pillbox when it is not necessary). The public address system again was used and this time with good results. Nine Germans gave up, the rest, some seven, being dead inside.

Immediately, the demolition crew sped out to the box carrying some 750 pounds of TNT. Here again there was some delay, for after setting the explosives, the group was trapped by a heavy enemy mortar and artillery con-

centration. Jerry has all of his boxes registered and so, though he was shooting blind, the fire was quite effective. When it "let up," the crew set the fuze and infiltrated back to the jump-off point. The bunker exploded and all that remained was a mass of rubble.

The mission was accomplished because we adhered to what we believe to be the elements of the attack and reduction of a pillbox. They are:

1. Neutralization of supporting positions.
2. Attack on the box.
3. Destruction of the objective.

Pillboxes being integral parts of well-prepared permanent defensive systems, their attack requires careful planning, rapid action, prior rehearsals (if possible), and additional plans to meet the *expected* but unavoidable contingencies. If the above is carried out, the German pillbox will crumble, and instead of remaining a pillar of strength for the Wehrmacht, will become a trap from which the defenders cannot escape.

Then the Americans took a hand. Although virtually cut off during the day, we were not out of reach of American artillery, in particular their SP 155's who had been supporting us throughout. We had an OP Officer called 'Chunk' Babcock, a bloody great monster of a man who certainly knew all the answers. As the firing died down it was known that there were quite a number of German Infantry in a certain wood to our right front. The American OP then called for a special concentration on it, calling for every gun within range to engage, and it was one that could only be ordered by an American General. However, it came down within a minute and a half and it certainly was a real "pandemonium." Afterwards two Germans who surrendered said that arms and legs were flying right and left in the wood and they must have had some 800 or 900 casualties. Although this is no doubt a gross exaggeration, it will, I think, give you some idea of the sort of shoot it was. It may have caused telegrams from Washington due to the colossal amount of ammunition expended, but it certainly put "finis" to any further German attack that evening or that night, and must have done a lot of damage.

—Extract from a letter from a C.O. of a British Battalion fighting in France.

Principles of French Military Legislation

IRVING M. GIBSON

IN the organization of national defense there are two elements: the regular army of experts and professionals who satisfy the reduced peacetime requirements, and the trained citizens or reserves who swell up the ranks in war. The relationship of these two factors determines the character of armies. If the professional element preponderates and succeeds in forming a class or caste in society like the Junkers in Germany, we get militarism at its worst. If the citizen element prevails, the result is a mass incapable of maneuvering and major tactical effort. The army of Vercingetorix—the first *levée en masse*—was kept in check and ultimately defeated by Caesar's few legions. Two thousand years later, history repeated itself on the classic soil of Gaul. The panzers rode to easy victory, trampling down *la nation armée*, the product of a military legislation which had consistently rejected General De Gaulle's suggestions for the establishment of an *armée de métier*.¹

The ideal thing is the happy medium. This aim has been established by the directive issued on 1 September 1944 by General George C. Marshall, Chief of Staff, relating to the postwar army, which rejects the European type of standing army as the old breeding ground of class discrimination and militarism. It would, however, be a mistake to overgeneralize. The history of the French army in the Third Republic proves that principles, no matter how idealistic, must inevitably be altered or transformed by the force of circumstances.

French military legislation in modern times derived much of its inspiration from the "amalgame" of the *levée en masse* decreed by the Convention in 1793 with the royal army which the Revolution had inherited from

the old regime. Thus the ideal of the combination of the regular and the citizen soldier was attained with results which later surpassed the wildest expectations. The various regimes following Napoleon experimented with various methods and devices. The defeat at Sedan made fundamental legislation imperative. The question was how to find the happy medium, what should be the right proportion between the active force and the reserve. In the following political controversies the parties of the Right became the advocates of a heavier regular force in the peace establishment, whereas the parties of the Left insisted that the militiaman was a better expression of the egalitarian principles of a democracy than the long-service regular. This may appear an extreme view in America, but in the country of the Napoleons and Boulangers it was a natural reaction. Here the regulars, there the militia. Quality versus quantity, élite against mass.

Problems of national defense were thus dragged into the political arena. There was an undertone of mutual suspicion in these debates which on the whole were motivated by genuine patriotism on both sides. But the Left scented reaction in an active army which numbered 25,000 officers tending, as they thought, to develop class spirit, whereas the Right, remembering the bloody excesses of the Commune of Paris in 1871, showed great reluctance to "put a gun on the shoulder of every socialist."² In subsequent years the tension increased until it came to full explosion in the Dreyfus affair in which the Left won a great victory.

As a consequence, a radical reform was prepared and voted in 1905. After this law the French army emerged as the ideal organization in national defense in a democracy, a true nation-in-arms. Its officers were to be "educators," teachers of the "citizens in uniform." Formal mechanical discipline was rejected, to be replaced by inner discipline

¹ Colonel Charles De Gaulle, *Vers l'armée de métier* (Paris, 1934). American edition: *The Army of the Future* (Philadelphia, 1941). At that time an unknown officer receiving no recognition, the now famous French leader, through this book, became the originator of modern warfare by preparing the tactics and organization of the armored division. Before 1940 he could get no recognition in France, but the Germans fully developed his ideas.

² The slogan of Adolph Thiers, first President of the Third Republic and the man chiefly responsible for the very conservative military law of 1872.

arising from a deep faith in the cause which this army would be called upon to defend.² When, however, the German standing army was raised to almost 900,000 men in 1913, panic broke out in France which swept away the ideal reform and reinstituted the old *armée de caserne* with the three-year service. There was no other choice, as the majority maintained.³ The fate of the reform of 1905 proves the famous dictum of General Castelnau, chairman of the powerful Military Committee of the Chamber of Deputies in the 1919-1924 legislature, that military laws are always the results of or adaptations to circumstances.⁴ In other words, much depends on the probable opponent and the probable theater of war.

After the war, the Left proposed the abolition of the standing army, since Germany was to disarm. The demand seemed just. The country needed a respite. But circumstances again intervened.

The war produced a great revolution in military thought and particularly in military organization. Before 1914 the field armies were prepared without plans for industrial mobilization or total effort. With light equipment and tactics based on mobility, they were expected to seek a quick decision by annihilating the enemy's field forces. Wars waged by entire nations with all their resources were unknown. As a parliamentary paper declared, military legislation before 1914 prepared the armies but not the nations.⁵

² A statement made by General André, Minister of War, on 19 June 1902 in the Senate. *Annales du Sénat, Débats*, LXL-LXII, p. 1040.

³ The law of 1913 raised the standing army to 830,000 men. What that meant to France can be better visualized by applying the proportion which this law created between the army and the population to American conditions. It would correspond to a peace establishment of almost 3,000,000 men in this country! See Senator Doumer's appraisal of the law in his reform project, *Sénat, Documents* (1920), p. 2. Senator Doumer in 1913 was the official *rapporteur* of this law.

⁴ *Annales de la Chambre des Députés, Débats, Journal Officiel*, 22 March 1922, p. 961. General Castelnau was Deputy Chief of Staff in 1914 and later one of the most successful army commanders. His speech in behalf of the reorganization project prepared by his committee is one of the most typical summaries of the postwar French view on military legislation as seen by the Right. For the best exposition of the program of the Left see Paul Boncour's speech, *Ibid.*, pp. 1182 ff.

⁵ *Commission Militaire de la Chambre des Députés, "Organisation militaire générale," Chambre, Documents* (1922), Nr. 5321, p. 733.

After 1918 parliament faced a set of new and perplexing problems: total war had to be organized in peacetime. Modern industrial nations with their complex social and economic organization require a long time to convert from peace economy to war economy. We have experienced the birth pangs of our own war effort quite recently and we all remember the Herculean task. It took us two years just as it had taken the French two years after the Battle of the Marne to complete total mobilization. The result was their victory at Verdun.

After the peace treaty, the French parliament realized that total effort in a future war would require a long time again. Who would protect the national frontiers while this conversion took place?

The law of 1923 provided for a *couverture*, as they called this protective force, of thirty-two divisions. It was to be highly mobile and was to operate offensively by carrying the war into enemy territory. While the *couverture* would fight, the nation would mobilize for a total effort. But it was impossible to maintain thirty-two divisions in peacetime even at reduced effectives without a large standing army. The old dispute of how many regulars and how many militia-men flamed up again.⁷ The Left parties, pointing to the lessons of the war when, as they said, the nation fought in the trenches and won and not the officers,⁸ demanded the reduction of the regular force to the minimum and the establishment of a national militia with a short eight or nine months of service. Yet the *couverture* had to be maintained. There was no way out of this dilemma except to build the Maginot Line, which replaced the thirty-two mobile divisions with fortifications. Behind this wall the militia could be

⁷ As the counter-project of Deputy Daladier declared, the nation-in-arms has nothing to do with the men in the barracks but only with those who left the barracks fully trained. *Chambre, Débats* (1922), p. 1412.

⁸ For a typical instance, see *Ibid.*, p. 612. On 14 March, Deputy Bouteille, who claimed to represent a moderate party group, declared that the real hero of the war was the soldier and not the officer. The Left applauded vigorously. An interruption, however, pointed out that this was bad language apt to set the men against their commanders. Great cheers from the Right greeted this remark.

organized preparing the nation-in-arms, that is, a mass army. The legislation of 1927-28 set up a system in which, if general mobilization were ordered again, not an army would march to battle but the whole nation.

France was peace-loving and tired of war. But her people were also utterly conscious of the need for security. They built the Maginot Line hoping to be safe behind its ramparts even though they reduced the military burdens to the minimum.

Training was absolutely defensive in this militia, because the policy of the nation rested on principles of non-aggression and collective security. The tactics were modeled on the gigantic defensive battle of Verdun where fire power proved to be the decisive factor. Yet circumstances called for motorization and mechanization, for speed and offensive tactics. All this could be achieved only if the army included as large a professional

or semi-professional element as the budget could bear—as De Gaulle rightly foresaw. But the universal acceptance of the militia principle by the vast majority of the public, and after the elections of 1924 also by parliament, on the one hand and the demand for *couverture* on the other forced this solution upon the nation and its armed forces. It was the road which led to Dunkirk.

The lesson of the French experience stands out clearly: it is impossible to legislate in army matters with preconceived rigid principles. Organization of defense may rest on a few fundamental ideas but otherwise it must be pliable so as to adjust itself to changing circumstances. Defense in wartime is a task force of strategy, in peacetime a task force of policy. As General Castelnau put it, the legislature of a nation must either create the army of its policy or else must be satisfied with the policy of its army.

New Dive Flaps Overcome "Compressibility"

From *Army Ordnance* January-February 1945.

VICTORY has at last been achieved over the most baffling puzzle of modern fighter airplanes—the strange phenomenon of compressibility in high-speed dives. To the aerodynamicist compressibility has been a stone wall which has barred his aircraft from reaching the speed of sound. But to the fighter pilot, compressibility has been a phantom hand that seized his airplane during combat dives and shook it out of control.

After three years of incessant research by pilots and engineers of Lockheed Aircraft Corporation and of the Army Air Forces Matériel Command, a device has been developed which overcomes the effects of compressibility. It consists of two hinged strips of metal smaller than a card table hinged to the under side of the airplane wing and operated by a button on the pilot's control wheel. Where ordinary dive flaps serve primarily as a brake, the Lockheed flaps control the flow of air across the wing to defeat the phenomena of compressibility. They permit the Lockheed P-38 Lightning to dive at tremen-

dous speed but still under full control. With the possible exception of the new German rocket fighter, the Lightning now can outdive any fighter it meets in the air. It is understood that the flaps have been successfully tested on another ranking American fighter and are under test on a third. They have been in full production on the Lightning for months, and "flap kits" are en route to the theaters for modification of earlier P-38 fighters whose speed first carried the airplane into the zone of compressibility.

The phenomenon may be likened to snow piling up in front of a plow and breaking loose in chunks. Masses of air pile up in front of the wing during sharp dives. These masses break off, roll back, and strike the tail surfaces so hard that the turbulence causes extreme buffeting of the airplane. Additional buffeting is set up in the wing itself by a conflict between two laws governing air flow. The dive flaps are a solution to this difficulty throughout the tactical speed range of today's aircraft.

The Fall of Ormoc on Leyte

From official reports of the operations on Leyte.

The 77th Infantry Division landed on the east coast of Leyte late in November of 1944 and was attached to XXIV Corps, which with X Corps had made the beach-head landings on the island some time before. On 1 December the 77th, by that time dispersed for the most part among the various elements within the XXIV Corps area, was alerted for an independent shore-to-shore move and assault landing on the west coast of Leyte. By 25 December the drive which started 7 December with the division's assault landing on the beach just south of Deposito was, according to reports, to initiate the personnel of the organization to some of the bitterest fighting in the Pacific theater up to that time. Christmas Day marked the capture of Port Palompon and the consequent closing of the enemy's last available port "for reinforcements or evacuation of his troops." The fall of Palompon also assured the complete destruction of all remaining enemy resistance on the island of Leyte.

This article, after a short introduction to the situation, will follow the progress of the 77th Division from its arrival in the Terragona-Dulag area on the east coast of Leyte until that part of its campaign on the west coast which saw the successful conquest of Ormoc.—THE EDITOR.

ORMOC, on the west coast of Leyte (see sketch), proved to be a thorn in the side of American forces liberating the island. Through this point the Japanese poured reinforcements and supplies to maintain their defense on the island against the American X and XXIV Corps. Operations by the X Corps were progressing satisfactorily in the northern part of Leyte. In the XXIV Corps, the 96th Division reached Dagami; and the 7th Division which had captured Burauen, continued its advance westward against considerable resistance. The 7th Division, however, was relieved in this area by the 11th

Airborne Division, and it then moved via Dulag and Abuyog to secure the Abuyog-Baybay road and to attack north on the west coast of the island from Baybay toward



Ormoc. An amphibious attack on the west coast had been considered, but the idea was abandoned for the time because of lack of shipping.

The move of the 7th Division proved to be a herculean task*, but elements of that division had reached Baybay by 5 November and had got as far as Damulaan by 11 November.

The 77th Division landed in the vicinity of

* See "Supply Problems on Leyte" by Colonel F. E. Gillette, MILITARY REVIEW April 1945.

Tarragona and Dulag on 25 November 1944, after having had its destination changed while en route to New Caledonia from Guam, and was attached to XXIV Corps. By 27 November the possible employment of the 77th seemed to be tending toward parceling out elements of the division here and there to protect corps and army installations; roads, bridges, and mountain passes; and to reinforce or relieve other elements of the XXIV Corps for more active operations against the enemy.

About this time, shipping became available, and the decision was made to launch an amphibious assault on the west coast of Leyte in an area propitious for an attack on Ormoc. The 77th Division was assigned the mission.

When the warning orders for the 77th Division's move to the west coast of Leyte were received on 1 December, elements of the division extended from Baybay on the west coast of Tarragona on the east coast, to the vicinity of Tacloban on the northeast coast, and to the mountains in the Burauen-Guinarona area. One battalion of the 307th Infantry was located on Samar Island, and other elements of the division were under operational control of XXIV Corps, the 7th Infantry Division, and the 11th Airborne Division.

Assembly of the scattered division units was begun in face of extremely difficult conditions of weather, road conditions, transportation, and other factors. Wide dispersion of all elements and extremely poor roads hampered movement of both troops and equipment, particularly the 307th Infantry which had to return to the staging area over a road that torrential rains and continued movement of supplies had turned into a ribbon of mud. Pocked with deep holes, the road permitted movement of trucks only with the assistance of bulldozers; guns could not be towed by their prime movers and had to be pulled through the mud by tanks and bulldozers. Officers and men worked day and night to get the equipment to the beach on time. By 5 December it became apparent that all units scheduled to make the initial

convoy would reach the assembly point soon enough, although some of them, particularly the 306th and 307th Infantry, would probably complete assembling on the beach just about in time to load into the assault shipping.

Scheduled to leave in the convoy were the 305th Infantry and the 307th Infantry (less 2d Battalion), the 2d Battalion, 306th Infantry, and the 902d Field Artillery Battalion. Also included were military police, reconnaissance, signal, quartermaster, ordnance, engineer, medical, antiaircraft artillery (automatic weapons), chemical weapons, bomb disposal, amphibian tank, and amphibian tractor units and a support aircraft party. The remainder of the 306th Infantry and the 305th Field Artillery Battalion did not join the division until 9 December, landing at Ipil.

The division had been warned that shipping in the initial convoy could not remain more than approximately two hours in the landing area. This meant that all troops, supplies, and equipment had to be landed on a hostile shore within that time. Therefore, all supplies and equipment to support the initial attack and to sustain the division until the arrival of the second convoy had to be mobile loaded: i. e., loaded on the limited number of vehicles which the division was taking so that all supplies could be brought ashore with the vehicles when they debarked.

The 7th Division, meanwhile, launched an attack northward from Damulaan on 5 December, at which time the 11th Airborne Division attacked westward through the mountains to complete a pincer on the Japanese 26th Division.

The 77th Division convoy left the rendezvous area with its escort at about 1300 on 6 December en route to the west coast of Leyte via the southern tip of the island and thence north through the Camotes Sea. The move to the vicinity of the landing beaches, which were just south of Deposito, was made successfully and without incident under cover of darkness.

At 0640 on 7 December, bombardment of the beaches was started by some of the escort ships. Air cover arrived over the transport

area at 0700, and at that time assault waves of the division headed for the beach. The first wave cleared the beach immediately, advanced inland, and was followed in good order by the remainder of the landing force.

The beach area was extremely limited, and the landing of a major part of the division on this narrow beach within the space of two hours was extremely hazardous. Had opposition to the landing been heavy, the division would have suffered serious loss during those two hours. The belief of the Commanding General, based on previous reconnaissance by aerial photos and questioning the natives, that this area would be lightly defended if at all, and his selection of this particular beach just south of Deposito, were justified by the successful landing of the assault force. Division headquarters, including the Assistant Division Commander and General Staff Sections, landed at H plus 35 minutes—a unique achievement in amphibious warfare up to this time.

The landing of the 77th Division placed the division behind the 26th Japanese Division, which had been opposing the northward advance of the 7th Division from Baybay, and in rear of enemy troops operating in the upper Ormoc Valley against the X Corps to the north.

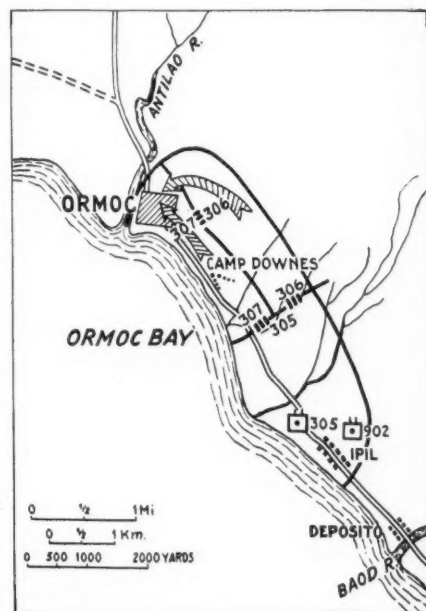
Enemy air was very active in the opposition of the landing, but most of it was directed at assault shipping as it left the transport area. Only two attacks were made on the division beaches, and no damage to installations resulted.

Organic artillery support available initially was only the 902d Battalion and one company of am tanks [amphibian tanks] with 75-mm howitzers which were initially attached to the 307th Infantry. Artillery fire of the 306th Field Artillery Battalion was available on call from positions immediately behind the front lines of the 7th Infantry Division about 8,000 yards to the south. The 226th Field Artillery Battalion of the X Corps had been moved into positions near Daro on the east side of the mountains and could also fire on call.

All initial objectives were reached early.

Because of the light resistance, the Commanding General decided to move on Ipil farther up the coast without delay instead of holding on the bank of the Baod River as had been originally planned. By 1600 on 7 December, Ipil had been captured and the positions were dug in for the night.

The character of the operation for the first day had indicated that the division had landed in an area occupied by service elements of



enemy divisions fighting to the east, north, and south. Since this meant that it would probably be a day or more before the enemy could assemble sufficient forces to counter the landing, the Division Commander decided on a relentless drive northward to extend the beachhead and capture commanding terrain features before the enemy had a chance to regroup his forces.

The drive was pressed forward from Ipil toward Camp Downes on 8 December against mounting resistance which became extremely

heavy about halfway to Camp Downes. M-8's and M-10's [self-propelled artillery] were brought well forward and in many cases delivered point-blank fire on the enemy, who were then assaulted by our infantry.

Camp Downes was sited on commanding terrain which was very favorable for the defenders and extremely difficult for the attackers. The Japanese fully realized the situation and defended this terrain stubbornly, probably hoping to stop the drive northward at this point. As a result, the efforts of the division succeeded in bringing it only to the high ground just south of Camp Downes by the end of the day; however, the 307th Infantry had captured this objective by 1600 on 9 December, even in face of heavier opposition than had been met the day before.

The 305th Infantry had, since the landing, protected the southern flank; and now, as the attack was pressed northward, the southern flank was gradually withdrawn. This left the division clearing station and the supply installations at Deposito within small-arms range of the main line of resistance on the south flank, but this was necessitated and justified by the advantages gained from a rapid continuation of the drive northward. Service forces were warned that they would be responsible for their own defenses to supplement the protection afforded them by the 305th Infantry. In an attack of this nature, where infantry support is limited, it may frequently become necessary for artillery battalions and service troops to furnish their own close-in defense in order to permit rapid advance on the enemy by our infantrymen. All such troops should be prepared for this contingency.

An early-morning convoy on 9 December brought the 305th Field Artillery Battalion and the remainder of the 306th Infantry to the beach at Ipil.

The division command post was moved forward to the outskirts of Camp Downes in the midst of bitter fighting still going on in that area. The advance echelon of the command post was under enemy mortar and small-arms fire when it occupied the new location. At his new command post, from which Ormoc

was clearly visible, the division commander on 9 December issued oral orders for the attack and seizure of that town the next day.

The plan of attack was to advance on Ormoc with two regiments abreast. The 307th Infantry was ordered to make a frontal attack, while the 306th Infantry enveloped the enemy's northeast flank, maintained contact between the 305th and 307th Infantry, and furnished one company in division reserve at Deposito for close-in protection of the clearing station. The 305th Infantry was to remain in position initially defending its part of the line. The 902d Field Artillery, which had accompanied the division in its assault landing, was placed in direct support of the 307th Infantry. The newly arrived 305th Field Artillery Battalion was placed in direct support of the 306th Infantry.

Devastating preparation fires for the coordinated attack which was to jump off at 0930 were delivered by the 902d and 305th Field Artillery Battalions and were supplemented by infantry mortars, 4.2-inch chemical mortars, M-8's, M-10's, and the 75-mm howitzers of Company "A," 776th Amtrak Battalion. Preparatory fires lasted from 0920 to 0930 and were followed closely by the advancing waves of riflemen. In addition to organic and close supporting weapons, the town of Ormoc was effectively shelled by rocket firing LCM's of the 2d Engineer Special Brigade which moved in close to the pier at Ormoc to deliver their terrifying fires on the heart of the town. While the rockets were firing, the crews of the LCM's were engaged in a small-arms fire fight with the Japanese defenders on the pier. Enemy rifle and heavy machine-gun fire was returned by the 30-caliber antiaircraft machine guns on the LCM's. After all the rockets had been discharged, the LCM's withdrew from the harbor while still under enemy small-arms fire.

As the leading elements of the 306th and 307th Infantry approached the outskirts of Ormoc, their progress could be clearly followed by the naked eye from the division command post on the high ground near Camp Downes. The town of Ormoc itself was a

blazing inferno of bursting white phosphorous shells, burning houses, and exploding ammunition dumps; and over it all hung a pall of heavy smoke, from burning fuel dumps, mixed with the gray dust of destroyed concrete buildings, blasted by artillery, mortar, and rocket fire.

The frontal attack of the 307th Infantry was stubbornly met by the determined Japanese defenders who opposed it with heavy rifle and machine-gun fire from positions dug in under each house. Organic mortars of the regiment maintained a continuous barrage in front of the advancing infantrymen, and M-8's and M-10's were brought into the infantry front lines to fire point-blank into the enemy position.

A deep draw parallel to our front lines just on the southern outskirts of Ormoc made a formidable obstacle for our attacking forces; for the defenders were well dug in and had to be routed out with mortars, grenades, and the bayonet. Casualties to our own forces, in spite of the stubborn resistance, were extremely light owing to the extensive use of massed artillery fire and of supporting weapons. Impossible as it may seem, friendly casualties for the clearing of Ormoc numbered only thirteen. "Credit goes to the artillery and the chemical mortar company for their intense and accurate fires and to the infantry for the use of its own mortars, self-propelled guns, and unparalleled operation of the riflemen."

The 306th Infantry operating on the right of the 307th relieved some of the pressure from the 307th by a rapid and well-conducted envelopment of the enemy's northeast flank. The 306th also met stiff resistance in its sector but managed to effect the envelopment, thus trapping the enemy in an untenable position in the town of Ormoc. As a result of the action of the 306th Infantry, the enemy was under attack from two sides, was unable to withdraw into the hills to the east, and was forced to withdraw through the town of Ormoc to the north where he was continually harassed by the division artillery fire.

At 1330, leading elements of the attacking forces entered the town of Ormoc and fought

steadily through it from house to house in the face of heavy enemy artillery, mortar, machine-gun, and small-arms fire, most of which came from well dug-in and camouflaged fox holes and pillboxes under houses. By the end of the day, the town of Ormoc was cleared of all enemy except those who lay among the blasted ruins of the town, and front lines for the night were established on the northern outskirts of the town on the south bank of the Antilao River.

COMMENTS AND LESSONS

1. Accurate intelligence materially aided in the operations. So-called bold plans were made, but before being executed were preceded by an intensive reconnaissance to the vicinity of the objective; hence little risk was involved.

2. From a supply viewpoint, the operation was made on a shoestring.* At times only one-third of a unit of fire was available—which might have caused a disaster in case of a strong enemy counterattack.

3. The landing was accomplished with little opposition by placing approximately 2,000 men on a 1,000-yard beach every five minutes. Total time, including mobile-loaded supplies, was approximately two and one-half hours. Logistically, pushing that mass of troops on a beach in so short a time was a difficult operation; and had there been any considerable unexpected enemy mortar or artillery fire at any time during this period, great casualties might have resulted.

4. The Ormoc operation was accomplished by attacking to the north immediately after landing and by daily attacks against increasing enemy resistance, which resulted in the capture of Ormoc before the enemy could put up a strong defense. Fire power was employed to a maximum, especially that of the divisional artillery and self-propelled guns of the cannon and antitank companies. Operations were characterized by attacks by day and defensive positions of the entire division at night.

5. It has been rarely practicable to make large movements at night in this theater.

* See "Supply Problems on Leyte" by Colonel F. E. Gillette, *MILITARY REVIEW* April 1945.

6. Every effort was made by the division to issue orders for night dispositions by noon and to issue orders for the next day's operations by 1500. Halts about 1600 were made for the purpose of adjusting lines and for digging in before dark. Occasionally a por-

tion of the troops fought until after dark to capture key terrain.

7. Emphasis was placed on anticipatory detailed planning, from higher headquarters down to include the squad, in order to avoid piecemeal actions and to reduce casualties.

Mobile and Static Defense in Island Warfare

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ALLIED forces engaged in recent operations on a Pacific archipelago were confronted by a paradoxical Japanese defensive scheme which contemplated the achievement of mobility by the use of amphibious counterattacks and, at the same time, the maintenance of a static defense involving cave installations and key holding positions.

In the first phase of the enemy plan, counterlandings were intended to disrupt the invader's attack. Troops chosen for those operations were to be grouped into assault units capable of independent action. Upon landing, these troops were supposed to create havoc in the Allied rear echelon by cutting supply routes and communication lines; then they were instructed to fight their way back to the original beachhead. Apparently, no thought was given to the staging of a continuous operation behind Allied lines. Their "hit-and-run" tactics were modeled on Commando lines.

To provide a necessary diversion for the counterlanding parties, close-quarter attack units directly engaged with Allied troops on the beachhead were intended to drive wedges into their opponents' lines, paying particular attention to destruction of tanks. No previously prepared counterattack routes seemed to exist; instead, Japanese troops were to receive special training in movement through jungles and swampy terrain. Artillery, tanks, and heavy vehicles were to be brought along such avenues as could be cleared by the infantry.

At seeming variance with the foregoing policy of creating an active and mobile defense, the Japanese planned to increase the

number and strength of their fortifications, which were to be organized in considerable depth. The primary concern here was to reduce the number of casualties incurred during artillery barrages and aerial bombardment.

Numerous diagrams for the construction of cave installations were set forth as standards. Positions were organized as: water's edge emplacements, including "key holding positions"; key attack points; main installations; reserve positions; and retrenchments.

Water's edge positions were equipped with antitank guns, machine guns, and, if possible, automatic cannon. The prime mission for these weapons was the destruction of amphibious tanks, landing barges, and such personnel as reached shore. If the terrain adjoining the water's edge proved suitable, key holding positions were to be established to check the landings. Forces occupying beach positions were to lay down heavy small-arms fire, backed by artillery, during the initial landing.

Troops in the main installations were to effect a delaying action until reinforcements arrived from other areas. If, however, a favorable opportunity for counterattack presented itself before reserves arrived, the local commander was empowered to attack. These main positions were intended to contain battalion combat teams, including artillery, capable of independent action. Depending upon terrain, each position was to be 1,500 to 2,000 meters in diameter, protected by mine fields, tank ditches, and abatis. It is obvious that the limited terrain and artificial barriers erected left small scope for mobile warfare therein.

The Personnel Problem of the Hospital Ship Complement

MAJOR SIDNEY ROBBIN, *Medical Corps*, and
CAPTAIN THOMAS G. SCOTT, *Transportation Corps*
Charleston Port of Embarkation

MANY of the difficulties of an untried type of organization may not be properly evaluated until the unit has been committed to actual performance of its mission. Thus, the importance of the personnel problem to the Hospital Ship Complement was not fully appreciated until it had been emphasized by operating experience. The growth of this problem and the development of corrective measures have been witnessed to good advantage at the Charleston Port of Embarkation because this port has served as the home port for hospital ships to which Hospital Ship Complements are assigned for duty.

The Hospital Ship Complement is a Medical Department unit organized to operate hospital facilities on hospital ships. The organization is prescribed in T/O and E 8-537T. It is composed of medical, dental, sanitary, and medical administrative officers, nurses, and enlisted men. The number of personnel in each of these categories varies with the bed capacity of the ship concerned.

The hospital which is operated by the Hospital Ship Complement may be visualized as a large stationary hospital fitted into the restricted space of a ship. In the utilization of the available ship space, consideration must be given to more than the hospital facilities. There must be quarters for the ship's civilian officers and crew as well as for the personnel of the Hospital Ship Complement. Space must be available for carrying the necessary fuel, water, subsistence, and other supplies needed for the voyage. Allowance must also be made for laundry and baggage. The galleys must be large enough to provide food for everyone aboard, and in addition there are special diet kitchens.

This results in crowding the personnel of the Hospital Ship Complement into a more closely confined existence than previously experienced. While housed in barracks prior

to assignment to a ship, each enlisted man was allotted from forty to sixty square feet of floor space, depending on local housing conditions. In general, all personnel have less space aboard ship. The enlisted man, however, finds that he now has an average of about seventeen square feet, considerably less than was provided in the barracks. Obviously, there can be little privacy for the enlisted man in quarters or elsewhere on the ship.

Personality difficulties take on increased significance as a result of the forced close intimacy of the personnel on hospital ships. An individual with mildly irritating personality traits is readily tolerable under circumstances where periods of separation are possible. Aboard the hospital ship, however, such personalities become troublesome, particularly after weeks at sea, and disturb the equilibrium and morale of the organization. Persons with marked asocial or objectionable traits of character are also unsuited for this type of duty.

Company punishment is not as effective as it might be. Restriction to quarters has little meaning under the circumstances which exist on the hospital ships. Further, the individual being punished cannot be separated from those who are not being punished.

A problem of particular gravity is the close proximity of military personnel to the civilians provided for sailing the ship and operating the messes. The standards of discipline for the civilians naturally differ from those of the military personnel. Punishment is more severe for the military personnel, and crimes which go completely unpunished among the civilians result in penalties in the case of military personnel. Among the sources of discontent is the great difference between the pay of military personnel and the civilians. Because it is not possible to effect a segregation of the military personnel and civilians, these sources of difficulty as-

sume greater importance than otherwise.

Realistic consideration must be given to the usual problems that appear where men and women live and work in such close relationship. Except for the occasional member of the Women's Army Corps or the American Red Cross worker, the female personnel assigned to the ship are officers of the Army Nurse Corps and hospital dietitians. The difficulty of maintaining a proper and dignified officer-enlisted man relationship is evident. It is further complicated by the presence of civilian officers and crew members who are not subject to military discipline. Problems involving military and civilian personnel require extreme tact and diplomacy, especially where "affairs of the heart" are concerned.

The characteristic disadvantages of ships also have a bearing on the welfare of the personnel. Some individuals have or develop an intolerance for ship sounds such as the pounding of the engines or the turning of the propeller. Others are unable to become accustomed to the motion of the ship. In spite of insulation and ventilation, the odors and heat of the boiler rooms and fiddleys become irritating. An occasional individual is afraid of the water and is so constantly apprehensive of it that it is not possible to obtain sufficient sleep.

There is a condition to which the name "hospital ship fatigue" has been applied. Individuals who were healthy, efficient, co-operative workers when assigned to the ship develop symptoms of insomnia, loss of appetite, loss of weight, irritability, lack of interest in duty, and extreme persistent fatigue. "Hospital ship fatigue" is similar to the maladjustment experienced wherever prolonged confinement and boredom is concerned. It is necessary to remain continually alert to detect these conditions, for frequently it affects superior individuals who will fail to complain of their condition. All personnel develop a degree of fatigue, but this is usually eliminated by shore leave.

Individual tolerance for the confinement attending duty aboard a hospital ship shows considerable variation. While some individ-

uals manifest only a mild dislike for the assignment at first, this may develop into a strong aversion over a period of time and if prolonged may actually produce neuro-psychiatric symptoms.

Because there is little opportunity for "escape" from these confining conditions, every effort is made to grant passes, leaves, and furloughs when the ship is in port. In contradiction of this, however, every effort is made to keep the ship at sea performing its mission; therefore, unless the ship remains in port undergoing repairs, there is little time for the personnel to be absent from it.

Another personnel problem that is characteristic of service on hospital ships is the fact that personnel sent ashore for one reason or other cannot return to the unit at will. Individuals who have been left ashore because of illness, those AWOL, and those confined awaiting trial fall into this group.

Seasickness must be given consideration. A high percentage of the personnel experience seasickness at first but later become adapted to duty at sea. This type of seasickness does not take on the proportions of an important personnel problem. It is of importance, however, where adjustment to the motion of the ship at sea cannot be made, and the resulting habitual seasickness greatly reduces efficiency and state of health.

Morale and health are adversely affected by rough weather at sea. This is largely a result of continued loss of sleep because of the rolling and pitching motion of the ship. Further, portholes are closed, and ventilation is not so efficient as at other times.

The first prerequisite to corrective action is recognition and understanding of the problem by those in authority. There is an initial tendency to treat personnel problems in the same manner as they would be treated in a land hospital. This tendency must be overcome, particularly by those who have not been to sea with a Hospital Ship Complement. It must be recognized that a different condition exists and that necessary readjustments must be made with prompt efficiency.

The problem of those who require only a few weeks away from the ship to regain their equilibrium may often be solved by the need for repair of the ship. If the ship arrives in port in such condition as to require extensive repairs, most of the personnel may be granted substantial leaves and furloughs. All the personnel cannot leave, because it is necessary for a detail to remain at all times. The leave and furlough policy is liberal, and every effort is made to make it convenient to grant passes, leaves, and furloughs.

The personnel must be closely observed at all times for evidence of persons for whom life on a hospital ship is incompatible. Those for which no other adjustment can be made must be transferred to other duty.

A rotation policy has been established for "hospital ship fatigue" cases. As much as ten percent of the organization may be transferred to duty on land for the duration of one or more voyages, depending on the condition of the individuals. The station hospital at the Charleston Port of Embarkation lends real service in making this rotation policy possible. "Hospital ship fatigue" cases are given relief in the form of temporary assignment to the station hospital in duty similar to that performed on the ship. In this manner, the individual experiences no loss of skill and at the same time undergoes rehabilitation. A suitable replacement is assigned to temporary duty in the vacancy created aboard the ship.

Combat Psychiatry

From the Neuropsychiatry Consultants Division, Surgeon General's Office.
Reprinted from the *Bulletin of the U.S. Army Medical Department* April 1945.

OPINION is unanimous, among not only psychiatrists but all officers, that leadership is the greatest single factor which, by making for morale and confidence, results in lowering the incidence of neuropsychiatric casualties. After every campaign, one division commander lectures to every unit of his command on the tactics and strategy whereby the unit carried out the missions assigned to it. This general, starting at dawn on Christmas day, visited every unit in his division personally to extend his greetings. He trains his officers to know their men, to take a personal interest in them, and actually to lead them in combat. Morale is high in this division, which did much of the fighting. The soldiers of this division have faith in themselves, their weapons, and their leaders—three factors of utmost importance in making for low incidence of neuropsychiatric casualties. A division neuropsychiatrist has developed an unusually effective program which aims at increasing morale and preventing minor psychiatric disorders. This program is intimately integrated with the information and education program. The

division psychiatrist serves in a dual capacity. Classes in various subjects have been organized among the units, and many men have been stimulated to take courses in the Armed Forces Institute. Hobbies are encouraged. Discussions on subjects of wide interest are held. These activities likewise prevent the development of apathy from monotony and leave little time for soldiers to dwell on hardships. This psychiatrist has effected close liaison with G-1, thus effecting proper reassignments of mild psychoneurotics who are unfit for combat but who can do a good job in a service unit. The G-1 receives morale reports from every unit surgeon and chaplain weekly, and from the division neuropsychiatrist at intervals depending on the incidence of neuropsychiatric casualties. The consolidated reports are turned in to the chief of staff who takes up the problems of morale with each unit commander. Weak company commanders are relieved and reclassified or reassigned. All of these measures make for high morale and a low incidence of neuropsychiatric ineffectives in the division.

The Unit Engineer

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AN engineer officer is provided on the staff of the commander of each division and of each larger unit up to and including the theater of operations. In the theater this officer is known as the Chief Engineer; in the communications zone as the Engineer, Communication Zone; in the army, corps, division, and air force as the Army Engineer, Corps Engineer, Division Engineer, and Air Force Engineer respectively. Generally speaking, however, he is known as the Unit Engineer. The Unit Engineer is responsible for executing an ever increasing number of tasks, and in the present war his role has assumed far greater importance than ever before. Therefore, it is imperative that every staff officer thoroughly understand the duties and responsibilities of the Unit Engineer in order that they may work together in close coordination in all echelons of command.

Since every Unit Engineer functions primarily as a special staff officer, his principal duty is to advise, make recommendations, and assist his commander and the members of both the general and special staffs in all engineer matters. Although the relationship between a Unit Engineer (except the Division Engineer) and the Unit Engineer of a subordinate unit is not one of command, he is charged with preparing general plans which determine the scope of the work to be executed by all engineer troops in the command and with the technical supervision of all engineer activities of the command. If in carrying out these responsibilities it becomes necessary to issue orders to subordinate Unit Engineers, the order must be incorporated in the orders of the unit commander. The Unit Engineer exercises control over all engineer troops in the command and at the same time supervises the execution of engineer tasks by means of technical inspections of all engineering projects in his area and by requiring technical reports direct from subordinate engineer unit commanders.

The planning and supervision of the engineer activities of a command include many

and varied engineer tasks. Certain of these tasks are of greater concern to some Unit Engineers than others, depending upon the size of the unit. In a general sense, the duties of all Unit Engineers include the following:

1. Recommendations pertaining to, and supervision of, the training of engineer troops and troops other than engineers in engineer operations.
2. Preparation of plans for the employment of engineer troops and of other personnel which are to be used in executing an engineer task.
3. Determination of requirements, procurement, storage, and distribution of engineer equipment and supplies, including fortification, fire-fighting, and camouflage materials.
4. Preparation of plans for all engineer construction, repair, and maintenance within the command.
5. Preparation of plans for the construction, repair, maintenance, and operation of all utilities of general service not otherwise assigned.
6. Preparation of plans for engineer reconnaissance and the collection, evaluation, and dissemination of engineer information.
7. Preparation of plans for barrier systems, and for passage through such barriers.
8. Technical supervision of the construction of defensive works.
9. Preparation of terrain studies.
10. Recommendations as to traffic regulations; furnishing and posting signs for marking routes and giving traffic instructions.
11. Development and supervision of measures for camouflage of personnel and installations; preparation of instructions concerning camouflage and use of camouflage materials.
12. Preparation of plans for adequate fire protection, maintenance, repair, and operation of fire-fighting equipment, training of the personnel, etc.

13. Plans for surveys, for mapping, and for procurement, reproduction, and distribution of maps and map substitutes.

14. Assurance of an adequate water supply for all troops of the command.

15. Examination of captured engineer equipment and intelligence.

The Unit Engineer must at all times be thoroughly cognizant of the tactical and logistical situation. He must be especially careful to keep abreast of the changing situation and be prepared to make appropriate recommendations to his commander. To anticipate the needs of the command from an engineering standpoint, he must keep a very close relationship with both the general and special staff as well as with subordinate unit commanders.

The Unit Engineer's contact with the general staff must be close, and especially so with regard to the functions of the G-3 and G-4. He must coordinate with the G-4 in matters concerning location of water supply points. Under the supervision of G-4, he assists in the formulation and execution of the traffic circulation and control plan by execution of road and bridge reconnaissance from a technical point of view; supplying road maps, signs, route marking materials and other traffic control devices; recommendations for traffic circulation, sign posting, and route marking; construction, maintenance, and repair of roads and bridges; and supervision of traffic control at locations where engineer work is of prime importance.

The Unit Engineer works very closely with G-3 in all matters concerning troop movements (especially river crossings, defensive operations, and training) and camouflage. In river crossings, the Engineer is charged with all technical preparatory measures for the crossing, for distribution of engineer troops and matériel, the construction of bridges, and the regulation of traffic thereon. Therefore, the G-3 must coordinate very closely with the Unit Engineer on all river crossings; similarly in a defensive situation where extensive defensive works must be constructed and complicated barrier systems es-

tablished, in the breaching of obstacles and mine fields, movement over difficult terrain such as mountains, jungles, and swamps, and in other tactical operations, close coordination between the G-3 and the Unit Engineer is absolutely necessary.

With the G-2, he coordinates in matters concerning camouflage, engineer reconnaissance and intelligence, and the preparation or procurement, production, reproduction, supply, and distribution of maps. The G-2 prescribes the general map policy and the Engineer is responsible for the supply.

The Unit Engineer confers with the G-1 in matters having to do with personnel, administration, bivouacs, and rest areas. He must confer and coordinate with each of his fellow special staff members on matters which are of interest to them. Some of the more important matters which he would coordinate with certain special staff officers are as follows:

1. Ordnance Officer—antitank mines, ammunition, and maintenance of engineer vehicles (trucks, etc.).

2. Signal Officer—communications between various engineer headquarters and higher headquarters; training engineer personnel in radio operation.

3. Provost Marshal—traffic circulation plan.

4. Quartermaster—supply of food, gasoline, and oil, and necessary additional transportation.

5. Artillery officer (technically not a member of the special staff in the division)—camouflage requirements, routes of movement of heavy artillery, and survey and map requirements of artillery.

6. Antiaircraft Officer—protection for river crossings, construction of landing fields, and road and railroad work; also camouflage matters.

7. Surgeon—supply and purification of water, sanitation, and insect control measures.

The mission of the Unit Engineer is an important one and it is extremely important

that complete coordination be achieved in order that he may be of maximum value to his commander and to the commander's staff.

Although every Unit Engineer has the general duties and responsibilities previously discussed, the actual functions and operations of the Unit Engineer in each echelon of command vary considerably.

THE CHIEF ENGINEER, THEATER OF OPERATIONS

The Chief Engineer, Theater of Operations, functions primarily as a planner. He plans and coordinates the engineer activities of the theater; determines the requirements for engineer supplies and equipment; sets up general policies and priorities for the control of all engineer work carried out in the theater; and allocates engineer equipment, materials, and supplies between the several armies and the communication zone. In some theaters, he is given central control of all engineer troops (including aviation engineers) and equipment in order that he may allocate the proper units and equipment for the higher priority projects.

ENGINEER, COMMUNICATIONS ZONE

The Engineer, Communications Zone, is primarily an operating agent. The volume of engineer operations carried out in the communications zone is enormous; consequently, the Engineer has the bulk of the engineer troops in the theater under his control, particularly the service troops, for it is in his area that the greater proportion of engineer construction work (permanent type) and engineer supply operations are carried out.

The engineer activities and responsibilities of the Engineer, Communications Zone, can be arbitrarily separated into three principal functions: supply, construction, and maintenance and utilities. In an active theater, each of these functions alone is a staggering task. The functions of procurement, storage, and issue of engineer supplies are the responsibility of the Communications Zone Engineer. He exercises general control over all supply activities of engineers in his area

and maintains close liaison with the Chief Engineer on all such matters. He is directly charged with replenishment of all depot stocks of engineer supplies both in the combat zone and in the communications zone as approved by the Chief Engineer, Theater of Operations. These supply operations are quite voluminous, as is indicated by the fact that in one theater the Communications Zone Engineer is now operating approximately one and one half million square feet of engineer warehousing space.

Construction in the communications zone may be handled by the Engineer Construction Service, in which case the Commanding General of that organization is also the Communications Zone Engineer. The volume of construction necessary in some theaters has necessitated the pooling of engineer heavy construction equipment and all troops (even aviation engineers) under the Chief Engineer, Theater of Operations, in order to execute the construction mission in accordance with a suitable policy and under the regulation of necessary priorities. The Chief Engineer then makes allocations of troops and equipment based on the recommendations of the Communications Zone Engineer and the Air Force Service Command Engineer. The Communications Zone Engineer is directly responsible for practically all permanent type construction in the theater. It is really a staggering task, the difficulties having been increased enormously by the shortage of heavy earth-moving machinery and trained construction personnel. The engineer must supervise the construction, maintenance, and repair of hundreds of miles of roads and innumerable bridges; miles of railroads must be built and reinforced to carry the heaviest military loads; air bases and landing strips must be prepared for the air forces; all types of shelters such as cantonments, hospitals, warehouses, depots, and all other structures required by the Army must be constructed and maintained; and ports must be built and rehabilitated.

The Communications Zone Engineer's third large problem is that of maintenance and

utilities. The maintenance of all engineer equipment from the heaviest item of earth-moving machinery to the most delicate instrument is the responsibility of the Communications Zone Engineer. He is charged with supervision and control of all engineer maintenance activity in the communications zone. The equipment must be kept running at all costs regardless of the shortage of all types of spare parts, which is a very real problem in itself. After the necessary facilities have been constructed, they must be maintained and repaired. Utilities such as water, electricity, heat, and sewage disposal must be established, repaired, and maintained. This maintenance of all engineer equipment, maintenance and repair of all buildings and structures, and establishment, operation, maintenance, and repair of utilities throughout the communications zone is a direct responsibility of the Engineer, Communications Zone.

Additional responsibilities handled largely by the Communications Zone Engineer are the acquisition and disposition of real estate and facilities, and recommendations as to the use of routes of communications based on physical condition (traffic control). The function of real estate acquisition and disposition is quite an important function and no other Unit Engineer is so greatly concerned with it as the Communications Zone Engineer.

ARMY ENGINEER

Like the Engineer, Communications Zone, the Army Engineer is essentially an operating agent. His primary concern is the rapid construction, repair, and maintenance of communications facilities including roads, bridges, railroads, and air fields. The Army Engineer does not have the facilities nor the time to engage in any appreciable amount of permanent construction; the construction in the army area is of a rather temporary nature, just good enough to take care of the army needs while it remains in the particular area. The communications zone will replace army construction with more permanent types of structures.

The preparation of plans for the establish-

ment of barrier systems, including the construction of obstacles, the laying of mine fields, and the use of demolitions is a very vital function of the Army Engineer. The passage of such barrier systems is also of primary concern to him. He may set up standard policies both for the establishment of barrier systems and for the passage of these barriers. One example of this is an army policy for passing through mine fields which was set up by an Army Engineer in the European Theater of Operations.

The Army Engineer is responsible for the distribution of engineer supplies to all troops of the army. The Division and Corps Engineers are not in the physical channel of supply except in emergencies; therefore, the Army Engineer supervises supply of army, corps, and division troops and insures an adequate engineer supply plan. He recommends the location within the army area of engineer supply establishments not controlled by higher headquarters. Corps and division troops draw supplies from army supply points.

CORPS ENGINEER

The Corps Engineer is a special staff officer only, and is chiefly concerned with the rapid repair and construction of communications routes (primarily roads and bridges) and with the establishment and passage of barrier systems. As in the case of the Army Engineer, construction in the corps area is of a temporary nature, sufficient only for corps needs. As previously stated, the Corps Engineer is not in the regular channel of supply except in emergencies; however, he is responsible for coordination and supervision of engineer supply to corps and division troops by army. The Corps Engineer coordinates and supervises the supply of water to all corps troops by corps engineer units, and also the procurement, reproduction, and distribution of maps by corps troops both to corps troops and to divisions in the corps.

DIVISION ENGINEER

The Division Engineer, like all the other Unit Engineers, is a special staff officer on the staff of his commander; however, he

differs in one respect in that he actually commands the engineer troops of the division, the organic engineer combat battalion. Under his direction this combat battalion carries out all engineer missions for the division. The most important engineer tasks with which he is concerned are (1) emergency repair of roads and bridges to carry division loads; (2) removal or construction, according to the situation, of obstacles and mine fields; (3) engineer reconnaissance; and (4) river-crossing operations.

Like the Corps Engineer, the Division Engineer is not in the normal channel of supply; he is responsible only for the supply of water and maps to division troops and for the engineer battalion's organizational supply. The Division Engineer is charged with the coordination and supervision of sup-

ply of fortification materials and mines to units of the division by army, but the only engineer supply point which he actually operates contains local materials. He may, when directed by the division commander, screen all requisitions for engineer supplies before forwarding them to army for delivery.

In conclusion, it should be observed that although policies and procedures vary in each theater and also in each echelon of command, the Unit Engineer will always be charged with the general engineer tasks described in this article, and the key to his success will always be staff coordination. If the Unit Engineer is to be of maximum value to the command, all members of the staff must understand his duties and responsibilities, and must call upon him for advice and assistance in all engineer matters.

Assault Carriers

Extract from "The War at Sea," an article by Commander Kenneth Edwards, RN, in *The Army Quarterly* (Great Britain) January 1945.

HAVING played a notable part in the defeat of the U-boats in the central Atlantic, the "escort carriers" have come into their own as "assault carriers," and have made feasible operations which would otherwise have been chancy in the extreme. An excellent example was the invasion of southern France. In that operation there were present nine "assault carriers." These were to provide fighter cover over the amphibious force and the beaches during the landings, while the bomber and fighter-bomber support for the ground troops was to be provided by the Twelfth Tactical Air Force working from airfields in Corsica. While it is doubtful whether these aircraft carriers could have operated off the coast of enemy-occupied territory without heavy loss if the strength of the Luftwaffe had not already been sapped by the attacks of the British and American air forces, it is certain that the landings could not have been undertaken without them. As it happened, too, the progress of the ground troops was so rapid that by D plus 3 General Patch's forces had passed

out of range of the fighter-bombers of the Twelfth Tactical Air Force operating from Corsica. The whole responsibility for providing air support for the advancing troops, as well as providing air cover over the beaches and the naval force and transports and supply ships, devolved upon the aircraft from the "assault carriers." This responsibility they held for seven days, until captured airfields in the south of France had been sufficiently repaired for the Twelfth Tactical Air Force to move in.

From the south of France those small aircraft carriers went to the Aegean, where they and other ships did great work, interrupting the enemy's attempts to withdraw his garrisons from the islands of the Dodecanese and the Aegean, and paving the way for the liberation of Greece.

There is no doubt that these, or other "assault aircraft carriers" will proceed to the Far East, and that the aircraft-carrier forces in that theater of war will be very greatly reinforced in the near future.

Artillery as an Intelligence Agency

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Instructor, Command and General Staff School

INTELLIGENCE, according to Webster, is the capacity to know or understand. Conceivably, it can exist without being exercised if there is nothing to be known or understood. Our military language, however, does not deal in such abstractions. Military intelligence is the information itself, particularly information of the enemy, after it has been evaluated and interpreted, i.e., understood, by the intelligence officer. The G-2, therefore, if he has been well selected, already has intelligence in the Websterian sense, but military intelligence is something that he must obtain and develop. His success will be measured largely by the amount of information of the enemy and of the terrain in enemy hands which he is able to collect.

What are some of the items of enemy information which G-2 of the infantry division must have? He must be able to answer the essential elements of information (EEI) as announced by the division commander. These are the things the division commander must know in order to make his decision and formulate the details of a plan of operation. They will include such things as the enemy strength and the disposition of his forces in the division zone of action; the location of his infantry and artillery weapons, fortifications, and obstacles; identification of enemy units; location and movement of reserves or reinforcements; the condition of the terrain in the enemy zone; and timely information of all forms of enemy activity.

Being only human, our G-2 cannot produce all this information with a wave of the magic wand. He must have sources and collecting agencies upon which he can rely to procure the necessary information in time for it to be acted upon. Much of it must come from elements of his own division. Who, in the division, will be capable of finding out what G-2 wants to know? There are certain units whose principal reason for being is the securing of information: namely, the division reconnaissance troop, the intelligence and reconnaissance platoon of each infantry regi-

ment, the scout section of each infantry battalion, the reconnaissance section of the engineer battalion, and the reconnaissance elements of any units which may be attached to the division. All these information-collecting agencies will play an important part in G-2's plan for getting the answers to the EEI. There are, however, other elements of the division who may, in the course of carrying out their primary mission, come into possession of important information of the enemy. G-2, who wants to use all of the tools available to him, will not overlook these agencies in making his intelligence plan.

The purpose of this article is to consider the use of the division artillery as an information-collecting agency. The artillery's mission, of course, is the support of the combat elements of the division by fire power. In order to carry out that mission it must search out many details of the enemy situation and of the terrain under enemy control. Artillery targets include such items as enemy artillery, antitank weapons, machine guns, troop concentrations, tanks, vehicles, command posts, field fortifications, observation posts, and important bridges or defiles. In order to hit such targets, exact locations must be known. Accordingly, the artillery, in addition to its ability to deliver fire, must be and is organized and equipped to obtain this necessary information.

Are any of these details of particular interest to G-2? Will they assist him in answering the essential elements of information? Consider the location of enemy artillery positions. If they are well forward, an enemy attack may be indicated. Their disposition on the ground may disclose something of their fire capabilities and hence one or more possible directions of attack. If they are emplaced in depth, a defense or withdrawal is more likely. The number and caliber of artillery batteries will give G-2 some basis for deduction as to the type and strength of the enemy unit opposing his division. Similarly, location of troop concentrations, command posts, and

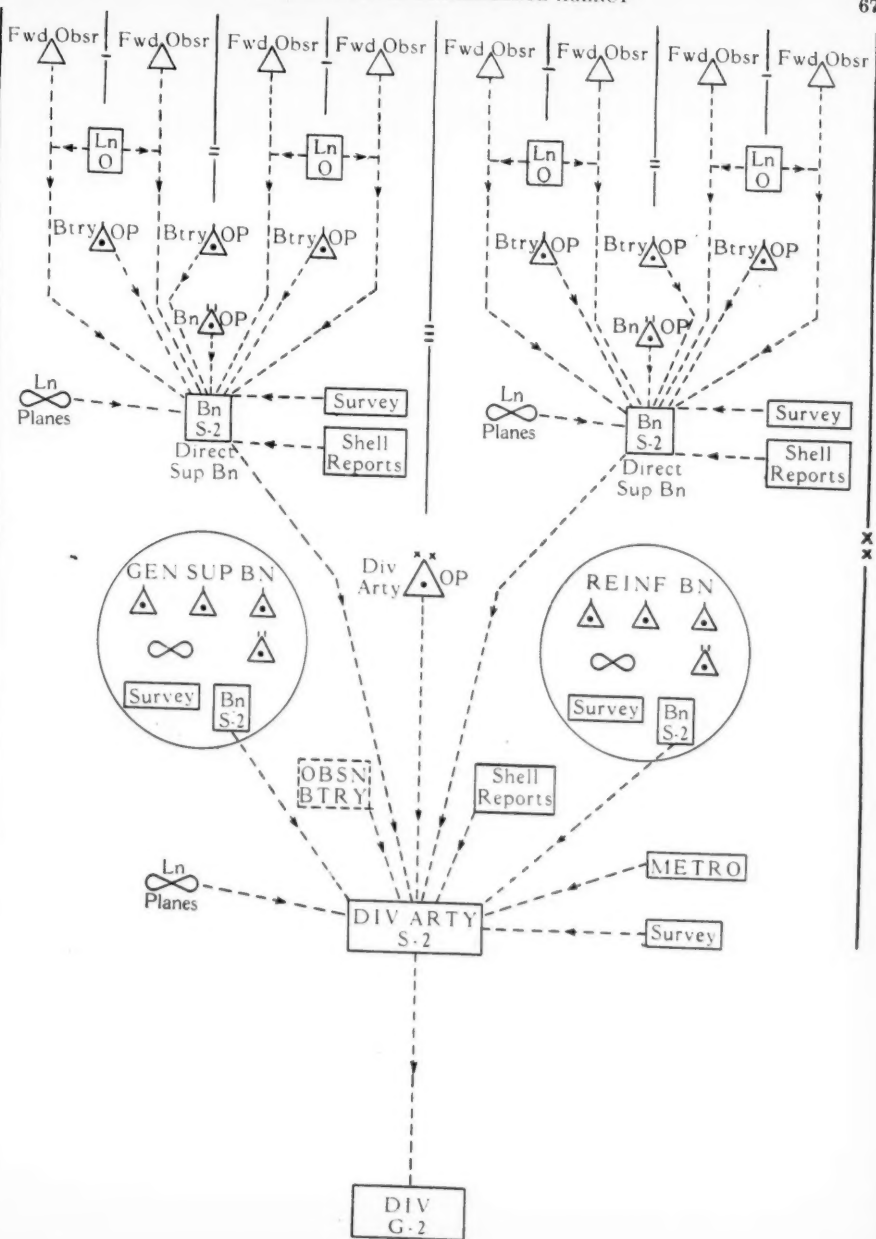
observation posts may disclose the enemy strength and possible schemes of maneuver and something about the capability of reinforcement. Disposition of antitank weapons will be highly important especially if the use of tanks in our division zone is contemplated. The nature and extent of defensive works and fortifications will help G-2 determine whether attack, defense, and delaying action are likely enemy capabilities. Obviously then, this information which the artillery must have is equally important to G-2.

Observation is the principal method employed by the artillery to get its information, and it has many eyes with which to observe. Its eyes for close-in detail are the forward observers. Normally, each committed infantry regiment in the division will have in its direct support at least one field artillery battalion. That battalion will send one field artillery liaison officer to each of the three infantry battalions and, if possible, one forward observer into the zone of each front-line company. The function of the forward observer is to see and report everything that takes place in the company zone to which he is assigned. He is primarily interested in locating and bringing down artillery fire upon hostile elements or activities which will interfere with the mission of his supported unit. In doing that, he stays out of the fire fight and confines his effort to observation, something that the infantry observers are not always able to do. He is trained to watch for and report to his battalion all hostile dispositions and movements whether or not artillery targets seem to be involved. He makes negative reports periodically if nothing is observed. He must also be completely familiar with the location of our own troops in the zone, reporting promptly any changes and movements. He knows how to identify enemy matériel and equipment such as guns, tanks, antitank weapons, and observation post equipment. Obviously this officer can be the source of a wealth of information as important to G-2 as it is to the artillery. Direct communication by radio and, if possible, wire exists between the forward observer and his artillery battalion.

Tied in to the forward observer's telephone line or radio net is the artillery liaison officer at the infantry battalion command post. This officer stays with the infantry commander as much as possible, goes with him on reconnaissance, accompanies him to the infantry observation post, and keeps in touch with the situation from the infantry viewpoint. He will generally know about all enemy information the infantry picks up as soon as the battalion commander does, and, not being involved in the fighting, may be able to report it more promptly. His mission of seeing to it that the infantry has the artillery support that it needs primarily involves the reporting of information to his own artillery battalion. The liaison officer also has the duty of coordinating the zones of observation of all the forward observers who are to operate with the companies of the supported infantry battalion so as to assure complete coverage of the entire battalion zone.

Going back to the artillery battalion, we find the battalion S-2 who is charged with processing, interpreting, and disseminating the enemy information which comes back to him from his information-collecting agencies. These include not only the liaison officers and forward observers mentioned above but also several other important sources. Each firing battery of the battalion will normally have its own observation post from which it can observe at least throughout its assigned zone of fire. In addition, S-2 will cause to be set up a battalion observation post to cover the entire battalion zone of fire, which incidentally will probably include considerably more than the zone of action of the supported infantry regiment. These observation posts might be called the middle-distance eyes of the artillery. They will not pick up detail such as is obtained from the forward observer but may get a more integrated picture of the whole. Width and depth will be increased at the expense of detail.

The long-distance eyes of the battalion and its eyes for looking around corners, over hills, and into defiles are its two cub airplanes, organic to the battalion and piloted by artillery officers. They are intended primarily to



facilitate observation of artillery fire upon targets at long range or deflated from ground observation. Incidental to this mission and without interfering with it, pilot observers are able to obtain a great deal of enemy information valuable to G-2. Dispositions, installations, and movements otherwise invisible may show up plainly from the air. Oblique photographs can be taken. Reports from combat zones indicate that artillery cub planes have collected more important information than any other observation agency organic to the division.

There is in the artillery battalion another agency engaged in producing essential artillery information which will often be important to G-2. That is the battalion survey section. In order to be able to mass fires, all artillery batteries must be accurately located on the map or firing chart with relation to each other and with relation to certain prominent terrain features. This is the function of the survey section. It makes use of such maps and aerial photographs as exist, and supplements and checks them by performing survey operations. In addition to locating the battery positions, it will determine the horizontal and vertical locations of a number of identifiable points in the enemy area, i.e., the target area, in order to facilitate accurate artillery fire in places where suitable targets are likely to appear. This type of information will assist G-2 in checking the accuracy of his maps, which is one of his important responsibilities. It may also give him more exact locations of some enemy installations than he may be able to obtain from other observers. Moreover, survey personnel in the course of their work may see and report enemy activity or dispositions, thus providing additional observation.

Finally, in the division artillery headquarters is the division artillery S-2. He is in direct communication with the S-2 of each artillery battalion and is constantly receiving evaluated and interpreted information from them. He has facilities for recording and further evaluation and interpretation. The division artillery, if feasible, may also set up its own observation post with a field of obser-

vation covering as much of the division zone of action as possible. There is also a division artillery survey section whose function is to provide common control for battalion survey operations. It will establish a survey information center—a source of terrain and mapping information for G-2.

Weather is another concern of G-2 and again the division artillery can be of some assistance. Its meteorological section exists for the purpose of determining atmospheric conditions which will affect the flight of projectiles and consequently is able to give some weather information such as wind directions and speeds and temperatures.

There may also be attached to the division artillery, though not organic, an observation battery from a corps artillery observation battalion. This organization is equipped to locate accurately enemy artillery positions by observing the flashes of the enemy pieces when firing, or by determining the direction of the sound of the discharge. The information furnished by it will be confined chiefly to location of artillery, but it also assists in survey. If no such unit is attached, it will be found in the corps artillery with whom the division artillery will be in close liaison.

Division artillery headquarters, like each of its battalions, has two cub airplanes for observation. These are less likely to be tied up in the actual conduct of artillery fire and hence are more available for general observation purposes.

Another type of information dealt with by the artillery is shell reports. These are reports forwarded by all units of whatever nature as to shelling by the enemy. They should include the time, duration, and intensity of the shelling and the direction from which it came. Direction may be determined by noting gun flashes if visible, and the direction of the sound of report. If these are not distinguishable, the angle of fall of the projectile and the shape of the shell crater may give some clue. The area shelled and the amount of damage done should be accurately described. Also included if possible should be the type and caliber of shell. The primary purpose of shell reports is to assist the artil-

lery S-2 in locating the enemy artillery. It is apparent, however, that the nature and amount of enemy artillery action and the location and type of targets attacked may well be an indication to G-2 as to the course of action being adopted by the enemy. It will also be an indication of the effectiveness, or lack thereof, of our own counterintelligence measures.

The diagram indicates the information sources and intelligence facilities that exist within the division artillery of an infantry division, assuming a formation with two regiments committed abreast, each with two battalions abreast, and each battalion having two companies committed.

It is not intended to convey the impression that G-2 can get everything he needs from the artillery or rely on it to the exclusion of other agencies within the division. Certain information can only be gained by actual contact with the enemy in combat, or by foot patrols or by capture of prisoners of war.

These are the province of the infantry. Longer-range patrols and reconnaissance will have to be executed by the division reconnaissance troop. Also, of course, information obtained through aerial photographs, agents in the hostile territory, and strategic studies, to mention a few items, will come to him from higher authority.

The artillery, however, does have the facilities for getting information from all parts of the battlefield, the communication channels over which to report it, and the intelligence personnel to interpret and evaluate it and pass it along to those who need it. Such a complete system—rather more complete than that of any other agency within the division—should not be overlooked by G-2 in planning his search for information. The limitation upon its use is that G-2 must not overload the artillery intelligence system to a point where it cannot carry out its primary mission of furnishing the information necessary to provide adequate artillery support.

The Burmese Defense

From a British source.

THE Burmese Defense, which is fighting side by side with the Fourteenth Army, numbers 10,000 men. Its operations are being facilitated politically by the Burmese anti-Fascist organization, and by the manner in which Karens, Kachins, Nagas, Shans, and similar hill tribesmen have stood by the British. Some of the officers have been engaged in similar guerrilla operations in other theaters, notably among the Maquis in France. Some were recent arrivals in Burma who did not know the native tongues, and others were old-timers familiar with many dialects.

They organized a procedure by which small teams were parachuted from aircraft, preferably by moonlight, in pre-arranged isolated spots in the jungle; they would often drop blind onto hilltops and into gullies, in treach-

erous weather in apparently inaccessible country. They were equipped with arms and food supplies, and they carried radio sets to maintain touch with the directing staff. Officers on the ground organized working parties and constantly changed their situations, obtaining intelligence by harassing the Japanese communications by organizing sudden coups.

Several British officers were captured and executed by the Japanese. One major gave himself up to prevent the Karen tribesmen from being subjected to savage reprisals for harboring him. The casualties, on the whole, however, were light compared with those inflicted on the Japanese. Some of the officers carried on jungle warfare for ten months before emerging to safety or being rescued by advancing columns.

Why Command Inspections?

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ONE of our foremost armored commanders has said: "Maintenance in a division is only as good as the commanding general wants it to be." But is that the whole answer? Based on personal observation and, we hope, a logical analysis, the answer is "No."

On this subject, like many other rather vague things in our military system, we sonorously intone, "Maintenance is a responsibility of command," and usually let it go at that. Some have even gone so far as to say that maintenance is the responsibility of everyone concerned and is placed in the command channel for control. Obviously, then, there is somewhere a missing link, for the job is not too well done, a fact on which we expect little disagreement. We think that missing link is the same one that occasionally causes good fields orders and tactical plans to go amiss—failure to execute the final step—supervision of the execution and results by commander and staff.

None of us fails to recognize the interest and responsibility of the commander, but in an armored division, for instance, he does not have time to inspect over 2,000 vehicles very often. Often the question is raised: "Other than the G-4, what interest has the general staff got in this matter?" The problem is supposedly delegated to an assistant G-4, hopefully appointed as a specialist, who harasses us by sending out spot-check teams, stopping our vehicles on the road, and sending down a scalding buckslip asking for an explanation of deficiencies. This stops our progress on unit training or what-have-you and requires possibly an agitated conference with the unit motor officer to frame a reply, the major purpose of which is to quiet down the wrath from above. Frequently the process results in correcting the individual defect—then oblivion again.

Let us take a look at the points that might interest some of the general staff officers on the division level. Probably one of the first apparent loopholes is that brain-truster, G-2.

How could he conceivably be concerned with automotive maintenance, for instance? According to the book, he does little actual executing, but should sit back in a rather detached manner, permitting his assistants to do the mechanics of information collecting while he analyzes, sifts, and interprets. But he also has a mission of developing, training for, and *supervising* the execution of intelligence and counterintelligence plans. Improper handling of motorized equipment can quickly shoot those plans to pieces. For instance, a part of the preventive maintenance on all armored combat vehicles is the proper care of radios and intercommunication equipment. Has he checked the radio equipment of the reconnaissance units recently? If their equipment is not working, how is he going to get his information from them *in time to act on it*? Now about this counterintelligence. On every vehicle issued to combat units there should be painted the letter "S" following the registration number on the hood. It indicates that the vehicle has certain spark suppressors, bonding straps between major units, and grounding washers installed by Signal Corps personnel. The purpose is to prevent interference from static electricity with radio reception on FM channels of our own sets. But if this interference occurs, will not an interceptor in the hands of the enemy pick up this same static discharge and by the use of direction finders possibly disclose our position? It is agreed the latter contingency is somewhat remote. A good G-2 never overlooks the remote chances. Some of the questions he might ask himself include: Have unit maintenance detachments been instructed on the importance of these suppression devices, the necessity of replacing them exactly as removed, or replacing the frayed and broken bonding straps? Have drivers been given that same instruction and impressed with the importance of reporting trouble promptly? Since they do not affect the operation of the vehicle, some drivers let it slide. Sure, we know. This is a job of the maintenance officer.

Yes, the job of execution is his, but in like manner the execution of camouflage and dummy installations is a unit one. Where these matters so vitally concern the collection of information for combat intelligence as well as the problem of counterintelligence, doesn't the G-2 have a mission?

What about the G-3? A lack of knowledge of the standard of maintenance in units of the division precludes the possibility of intelligent assignment of missions. During the fighting in France it was most encouraging to see some of the field orders of the 6th Armored Division in which there frequently appeared an order something like this: "...th Tk Bn join the Div at ---- on completion of maintenance." The results of such a policy have been clearly shown in that division's combat record.

Take another example, the operation of the 3d Armored Division from the St. Lo breakthrough to the German frontier. The corps commander has been quoted as saying that the 3d Armored led all the way, a distance well over 200 miles, never giving the enemy any rest. He was further quoted as saying that the 3d threw all rules of armored maintenance out the window and simply pushed to the limit of endurance of men and vehicles. It is undoubtedly true that many garrison-type rules were broken, but those tank crews lost no opportunity to service and check their vehicles whenever the situation permitted. The decision so to employ this division was a calculated risk. Both division and corps commanders had to know the maintenance standards of that division before they could take that risk. It is true that the American tanker will keep his vehicle operating longer on bailing wire and sheer "know how" than any other soldier in the world, but that is not the whole story. He must have a solid foundation on which to start. It has been emphasized repeatedly by observers and staff officers of armies and army groups that veteran tankers do a good job, but replacements, not too well grounded in the importance of preventive maintenance, almost immediately send the deadline for second and higher echelons of repair skyrocketing.

Similarly, they report that performance of 25- and 100-hour checks is almost impossible under combat conditions. The performance of 50- to 200-hour checks is considered fortunate. Under such conditions, proper first echelon maintenance by driver and crew is all the more essential.

This is not altogether an armored division problem either; the G-3 of the infantry division needs an eye and ear full. One of the most frequent complaints from separate tank battalions as well as observers, partial and impartial, is that infantry divisions do not allow tank battalions attached to them sufficient time for maintenance, and the same story applies to self-propelled artillery. Since almost every infantry division now has a tank battalion semi-permanently attached, it is a continuing problem. A G-3 who has learned that problem and its requirements through command inspections, properly conducted, can readily insure that one of his most important close-support weapons will be ready when he needs it most. Failure to take it into consideration could possibly bring catastrophe.

The first time I mentioned my belief that the G-1 was likewise concerned with vehicular maintenance I got a guffaw for a reply. Let me ask some questions which the G-1 can best answer for himself. The military police platoon is his most important agency for civilian control. Does he *know* whether or not their vehicles are in condition to permit the mobility necessary for this control? Another unit whose maintenance standards he should know is the medical battalion. He might ask himself: What will be the effect on morale if the medical evacuation equipment is not in condition to stand the grueling "round-the-clock" driving required in modern battle and results in the failure of our personnel evacuation plan?

Even more important to the G-1 is a statement which I do not believe can be successfully challenged. Show me the outfit with poor maintenance standards and I will show you one with low morale and a high AWOL rate. On the other hand, show me an outfit with good maintenance *which has been recog-*

nized by its commanders and I will in turn show you one with high morale and an inevitable and just pride in its accomplishment.

The connection of the G-4 and his assistants is clearly outlined in regulations and need not be expanded here, but he himself must know the story to coordinate properly the related functions of the special staff and his assistants.

How can the staff officer gain the knowledge required for these inspections? There are several ways. For many months the Ordnance Department has conducted a one-week course in automotive preventive maintenance at the Atlanta and Fort Crook Ordnance Depots. These courses are conducted for the sole benefit of staff officers. They are efficient and they get the subject across.

Lacking a week's time to devote to such a subject, an officer can gain a solid working foundation through a few hours of intensive work and study on actual vehicles under the direction of a good motor officer or sergeant. One now-famous armored commander took over an armored regiment at the start of the war when he knew little if anything about maintaining tanks. Brushing up quickly on what little he knew, he bore down on those things so hard that no one had time to learn his lack of knowledge on other points until he had bridged the gap. Officers who served under him still relate with a shudder of anxiety the stories of his command inspections and a moment later tell you with pride the record that outfit has had of keeping its vehicles rolling in combat under the severest extremes of weather conditions. He had another neat trick when inspecting a battalion: he took other battalion commanders in the regiment with him, as well as the company commanders within the battalion being inspected. The interchange of ideas and methods as well as the element of rivalry paid dividends.

Unfortunately there is another extreme. In one of our armored divisions, the staff with monotonous regularity sent down a memorandum every Friday that the commanding general would make a command inspection of

vehicles on Saturday morning. With equal regularity the general went only to the motor parks of his tank regiments, leaving officers and men of other units standing by futilely for hours until sure that he was not coming. The maintenance standards of the division were high in the beginning and the tank regiments improved; but those of the infantry units, the artillery, and the trains steadily declined and never recovered until combat had exacted a high cost. A vehicular crew is proud of work well done and commendation of it is just as necessary as is condemnation of poor work. So far as is known, no staff officer (except G-4 at very rare intervals) ever appeared in the motor parks of the slighted units. Had the general staff been used, together with the combat command and trains commanders on a rotated system of inspections, the story might have been considerably different. The men would have been satisfied that their efforts were recognized, and those officers would have benefited immeasurably by the knowledge of conditions in the units for whom they planned training and combat operations.

Recently I accompanied the commanding officer of an amphibious armored group on a command inspection of the vehicles in his command. The condition of vehicles was excellent; the men were alert and smartly courteous; the oil and grease houses as well as the dispensing equipment were unbelievably clean. Yet he raised unmitigated "ned" about one grain of sand he found on the underside of a grease drum top. Petty? Perhaps. But before we judge, let us look at the record. The vehicles we saw had been used to train more than a dozen amphibian tank and tractor battalions and operated more than three times their normal expected life. As to the near fanaticism on clean grease-dispensing equipment, the repair records show that out of those vehicles only two bogies had been lost, due to bearing failure, in over twelve battalion training periods and more than a year of operation. Such a record would be most enviable for a land tank battalion disregarding entirely the hazards and headaches of salt water and sand operation.

The effectiveness of this training has been amply demonstrated in some of our toughest amphibious landings to date. Kwajalein, Eniwetok, Saipan, Guam, Palau, Leyte, and Luzon all were among the invasions in which battalions trained there hit the beaches first or among the first. At Saipan they continued to operate for nearly two weeks as land tanks. The percentage of vehicles kept in operation under such arduous usage would lift eye-

brows. Their presence and effectiveness paid off in terms of shortened campaigns and lives of American troops saved.

A happy medium is the ideal answer. Require execution of good maintenance and it will be forthcoming. It is as essential to modern warfare as the supply of ammunition. The results? The title of Captain Ingersoll's book answers it beautifully: "The Battle is the Payoff."

Japanese Shipping Losses and the War Effort

Lieutenant Ray M. Stroupe, *Infantry*, Staff and Faculty, Command and General Staff School

HAMMERED daily by Allied aircraft and submarines, Japan's operable merchant fleet—her economic lifeline—is now estimated to be less than half the size required to maintain her armed forces and sustain basic industrial production at the early 1944 level.

With estimated sinkings exceeding new construction at the rate of 150,000 to 200,000 tons per month, the shipping situation is growing progressively worse.

Lack of sufficient shipping already has curtailed steel production by about one-third of factory capacity. It has prevented the maintenance of stockpiles of critical raw materials at safety levels. For instance, the backlog of bauxite, essential for aluminum production, was estimated at a one-year supply in the spring of 1944. Bauxite is now believed to have all but disappeared as the result of heavy demands for aluminum from the expanded aircraft production program.

Factors related to shipping losses are the cutting of sea communication lines and the shrinking of Jap-held territory through Allied

action. More and more, the Japanese are forced into economic dependence on the resources of the Inner Zone—Manchuria, Korea, and North China. This fact will accentuate the weakening process because of the lack of such essential war materials as oil, chrome, manganese, and nickel in the remaining territory.

The Japanese manpower situation is already stringent, and there is a lack of workers for a greatly expanded industrial program. Inconveniences caused by evacuation of families from the principal cities, as well as aerial attacks which force workmen into shelters and destroy their homes, create an appreciable loss of man-hours. One problem associated with the manpower shortage is the question of an adequate food supply for the working classes. The drafting of men from farm districts, the curtailment of activities of the Japanese fishing fleet, the difficulty of importing rice, hoarding, and increased consumption by the military forces have caused a serious scarcity of food in the homeland.

The Prevention of Trench Foot

From *The Bulletin of the U.S. Army Medical Department*, April 1945.

THE Surgeon General urgently recommends that every effort continue to be made by platoon and higher unit commanders to acquaint their troops with the factors involved in the cause of trench foot, and the preventive measures which are purely dependent on the individual's care of his feet. Proper footgear is highly important but alone will not solve the problem. The intelligent use of his footgear coupled with proper foot care falls on the individual soldier after he has been given the necessary instructions. It appears inevitable that, under the same climatic conditions, more casualties will occur in troops forced into relative immobility by heavy enemy fire for several days than in troops less heavily engaged. Effective measures can be taken even then by the soldier to ameliorate the causative factors of trench foot, as pointed out in WD Circular No. 312, 22 July 1944, and War Department Technical Bulletin TB MED 81, 4 August 1944.

Instruction of the individual soldier in the care of his feet when under these conditions should be repeated often. As an additional reminder, The Surgeon General's Office has a poster entitled "This is Trench Foot." The wide distribution of these posters should make troops foot conscious. It is suggested that such posters be placed in suitable locations on trucks carrying personnel in combat areas in addition to the normal placement of such posters. If placed in the interior of trucks on a bulletin board on each side attached to the upper framework near the tail gate, all personnel will see them.

Although Army personnel carriers have not been extensively used to transmit reminders on health, the exploitation of this means is highly desirable. In this way the posters will reach those who are in most need of the reminder—combat troops going into action. Posters on other health subjects from time to time can be brought to the attention of combat troops by this means, thereby leading to better conservation of health when preventive measures depend in large part of the individual and unit commander.

In the matter of footgear, modifications have been made in the shoe pac to improve its "ground-grip" and to afford better support for the foot. It comes in full sizes and three widths. This shoe pac now is being issued against requisitions received by the quartermaster. These shoe pacs should be fitted properly when worn with one or two pairs of socks, wool, ski. The same applies to the combat boots which are usually fitted to be worn with one pair of socks. When sock combinations are worn, a larger size will be necessary to prevent constriction of the circulation. Socks must fit comfortably loosely but not loosely enough to permit wrinkling. The socks or sock combinations for combat boots advised in order of preference are (1) socks, wool, cushion sole, two pairs; (2) socks, wool, cushion sole, and socks, wool, light, one pair each; (3) socks, wool, light, two pairs; and (4) socks, wool, heavy, one pair.

In keeping with similar pamphlets on health subjects from The Surgeon General's Office, another method of instruction is being used in the European theater. It is a thin cardboard folder, 4 1/4 by 6 1/4 inches, printed for issue to enlisted men of the 36th Infantry Division. The folder, entitled *Your Enemies: Germans and Trench Foot*, reads as follows:

"1. The German and trench foot are your most dangerous enemies during the winter months. You have been trained to protect yourself against the German and you must learn to protect yourself against trench foot. If you do not, you will become a casualty and suffer pain and discomfort. Ask some of the old men who have seen trench foot.

"2. The principal causes of trench foot are sitting, standing, or lying with cold, wet feet. Lack of exercises of the feet and shutting off the blood supply to the feet by wearing too tight shoes, socks, and leggings are other causes. Trench foot can and does happen without freezing weather.

"3. You can prevent trench foot by taking care of your own feet. Not once every week or two or three days: do it every day. There

may be an occasional instance when you can't do all the things to help, but you can still do most of them every day. Remember the following simple things and do them. No one else can do them for you:

"a. At least once a day, and several times if possible, remove your socks and shoes, get foot powder from your squad leader and rub your feet with your hands. If powder is not available, rub your feet without it.

"b. At least once a day change to a pair of dry, clean socks. If this is not possible and your socks and shoes are wet, do the next best thing, take off the shoes and socks, rub your feet, wring out the socks, and put them back on if you have to. You have, or will be issued, two pairs of heavy woolen socks and two pairs of light woolen. One pair of the heavy woolen and one pair of the light woolen are to be worn with the light wool next to your feet; the other two pairs are to be kept on your person. The light woolen can be kept under the helmet liner; the heavy woolen either pinned inside your field jacket, inside the shirt, or in the pocket of the new type field jacket. You will receive one pair of clean light woolen socks daily with your rations; you must turn in a dirty pair in exchange. Wash the heavy woolen socks yourself; it can be done. If you have to continue wearing wet shoes, remove them several times daily to rub your feet. If you do not have the socks, ask your squad leader to help you get them.

"c. Exercise your feet. This is very important when you are not able to move about freely. It can be done even in a foxhole or dugout by wiggling of the toes or placing the feet against the end of the trench and pushing against it. Keep it up until the feet become warmer and the circulation of blood to the feet is good. This should be done at least once each hour.

"d. Don't sleep with your shoes on if it can be helped, particularly if they are wet.

"e. You have, or will be issued, a pair of shoe pacs (boots with rubber lowers) with two pairs of felt inner soles. One pair of the

felt inner soles must always be worn with the shoe pac, the other pair will fit under the helmet liner. The felt inner sole will become damp from sweat and must be changed daily when the light socks are changed. Be sure that the shoe pacs are big enough to accommodate the heavy woolen sock and still not cut off the circulation to the feet. Remember the shoe pacs will cause the foot to sweat and it is still very necessary that daily care be given to the feet in the same way as previously described. The heavy woolen socks should be changed daily if possible and at least every other day.

"4. *Treatment of trench foot.*—If you see a soldier who has not taken care of his feet, you will probably see a case of trench foot. You can recognize it by his complaints that his feet feel heavy, woody, and numb, and at first not painful. On feeling his foot with your hand, it is cold, looks swollen, is the white color of wax, with blue places like rash especially around the toes. When his feet are warmed, the color changes to red, the swelling increases, the feet feel hot to the touch, and are very painful. If you see this, it is trench foot and it is important to know what to do as well as the things that can not be done: *Don't rub or massage feet after trench foot has developed. Don't place soldier with feet near fire or try to warm feet rapidly. Don't let soldier walk if it can be helped. Do place soldier on his back with feet raised about fifteen inches above rest of body. Do keep feet dry and cool. Do call medicos so that soldier can be treated.*"

As a further means of constantly reminding troops, the suggestion has been made that a label, printed with brief and concise statements and directions regarding trench foot, be pasted on each ration packet at point of storage. In this manner the soldier would receive repeated reminders of what he can do to protect himself against trench foot. Comments on this suggestion and information concerning any trial of these mediums of instruction should be addressed to The Surgeon General, U.S. Army.

Auxiliary Propellants

CAPTAIN ROY G. TULANE, *Infantry*
G-1 Section, Headquarters Tenth Army

While the policy of the MILITARY REVIEW is, generally, to leave subjects of such a technical nature for the Service journals, this short article will be interesting reading to many and may lead to some ideas that will be of benefit to the war effort.—THE EDITOR.

EXTENDING the discussion of rockets and long-range guns, which appeared in the MILITARY REVIEW for September 1944, page 110, to a consideration of auxiliary pro-

pute each round separately. Even so, the useful life of the barrel was very short.

Second, with the rocket, as with a gas-operated turbine, efficiency varies directly with the ratio of the speed of the rocket to the speed of the escaping gas. The efficiency of impulse and reaction type steam turbines is shown in Figure 1.

Since the speed of the escaping gas is high, 5,000 ft/sec [feet per second] and higher, it can readily be seen that at low speeds the

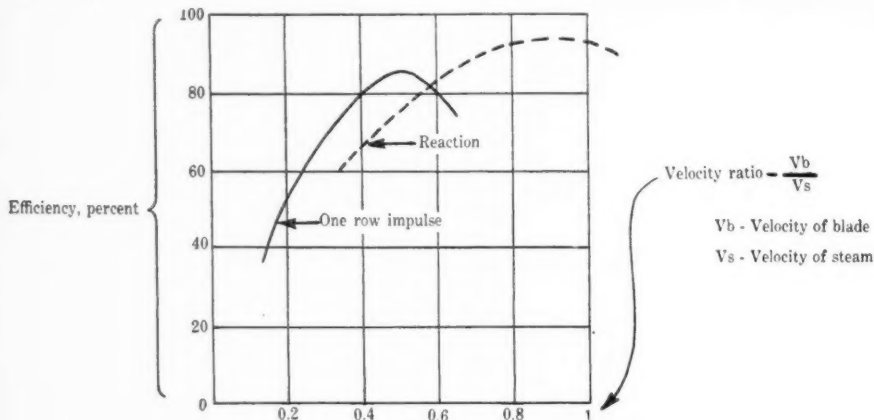


FIGURE 1.*

pulsion of standard artillery shells, certain interesting conclusions can be drawn.

First, with the long-range gun, an enormously high initial velocity is necessary to impart the necessary energy to the projectile. Since air resistance is directly proportional to the square of the velocity, at this high initial velocity an excessive amount of energy is required to overcome this air resistance. Further, this high velocity places an excessive strain on the gun and on the gun barrel. With the German long-range guns which shelled Paris, it was found necessary to calculate the wear on the bore for each round, and to com-

pute each round separately. Even so, the useful life of the barrel was very short. Second, with the rocket, as with a gas-operated turbine, efficiency varies directly with the ratio of the speed of the rocket to the speed of the escaping gas. The efficiency of impulse and reaction type steam turbines is shown in Figure 1. Since the speed of the escaping gas is high, 5,000 ft/sec [feet per second] and higher, it can readily be seen that at low speeds the rocket is highly inefficient and an excessive amount of fuel is required to accelerate it to an efficient operating speed. Since with the impulse type turbine (in which the steam is fully expanded in the nozzle before striking the vanes), the peak of efficiency is reached when the blade speed is one-half that of the impinging gases, and in the reaction type, the peak of efficiency is reached when the blade speed approaches that of the impinging gas, it can be seen that for a given speed of exhaust gas, the impulse type rocket can operate most efficiently at one-half the speed of a reaction type rocket. Referring again to the fact that the air resistance increases with the square of the speed, it follows that the

* Marks, ME Handbook, 4th Ed. (1941), page 1232.

impulse type rocket would be in the order of four times more efficient than the reaction type rocket. From the foregoing we can draw two conclusions:

1. That the rocket should be accelerated to its efficient operating speed by some external agency.
2. That the exhaust nozzle of the rocket should be so designed that the heated gases

pounds would be required. Using a maximum specific gravity of 1.5 for this propellant, it would have a volume of 4,549 cc and could be loaded into a cylinder 13.5 cm in diameter and 32.2 cm, or 13.6 inches, in length.

Considering that increased efficiency may result from the lowered initial velocity of the shell, compared with the long-range gun, and from the lack of loss in accelerating the

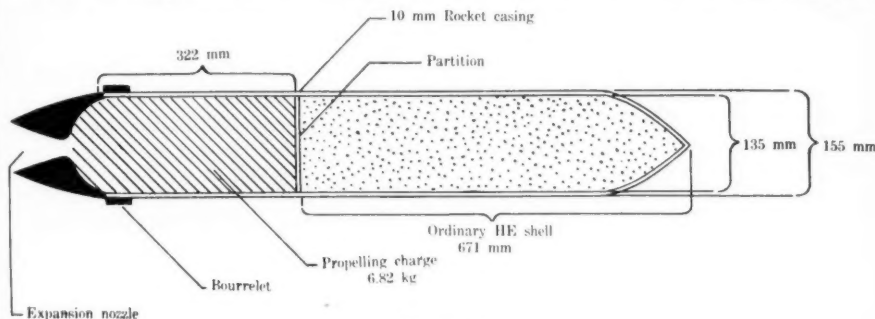


FIGURE 2.

are fully expanded before being discharged into the atmosphere.

Continuing, if a propellant can be designed to give a gas speed of approximately 5,000 ft/sec, a rocket with such a propellant would have a maximum efficiency at 2,500 ft/sec. This, strangely, is the initial velocity of the shell M-101 fired from a 155-mm gun.

Now, using Stettbacher's figures on propulsive characteristics for long-range guns,⁶ 200 kg [kilograms] of propellant of a power of 1,100 kcal/kg [kilocalories per kilogram] provided sufficient force to hurl 105 kg a distance of 120 km [kilometers].

That is, $200 \text{ kg} \times 1,100 \text{ kcal per kg} = 220,000 \text{ kcal} = 105 \text{ kg} \times 120 \text{ km}$ or 12,600 kgkm. $220,000 \div 12,600 = 17.46 \text{ kcal required to hurl 1 kg a distance of 1 km.}$

Now, a 155-mm shell HE M-101 weighs roughly 95 pounds or 43 kg. To increase the range of this shell by 10 km, roughly 10,000 yards, would require $43 \times 10 \times 17.46 \text{ kcal of energy or } 7,507.8 \text{ kcal. With a propellant of } 1,100 \text{ kcal per kg, } 6.82 \text{ kg or roughly } 15$

rocket shell, better performance than that indicated above may be expected.

Accuracy of such a shell would be influenced by three main factors:

First—The normal dispersion of the 155-mm gun, increased in accordance with the increase in range.

Second—Variation in the burning rate of the auxiliary propellant.

Third—Variations in the path of the propelling gases due to burning or pitting of the nozzle.

The first factor is always present; holding the second and third to a minimum should present no more of a problem than any other problem in ballistics. The new alloys which have made possible the jet-propelled plane may well provide a nozzle with a minimum of pitting and dispersion. In any event, the order of accuracy, because of the absence of fins, and the direction and rotation provided by the gun, should be far higher than from any present rocket.

Figure 2 illustrates a rocket shell designed in accordance with the foregoing. A practical test would be interesting.

* See MILITARY REVIEW September 1944, p. 110 ff.

Attack Through Woods

IN the attack through woods by a division observed in the heavily wooded terrain in the vicinity of St. Die, France, in October 1944, it was necessary to advance along roads through narrow valleys with high hills and thick woods on either side, all roads being heavily mined.

The following points were emphasized in orders issued for these operations:

a. Control is paramount. Therefore, everything must be done to maintain it.

b. Special attention must be paid to basic principles and combat formations.

c. Phase lines must be designated about 1,000 yards apart for checking all forward movements. These phase lines may be based on prominent terrain features or roads, or in absence of such, may be maintained by counting steps, use of engineer tape, or a time check.

d. Troops should be so employed that those not actually in contact with the enemy will push on to the designated phase line.

e. Upon arrival at phase lines, battalion commanders will report their arrival to regiment.

f. Battalions will move forward on order.

g. Leading men, when fired on by enemy MG's or MP's, immediately open fire in the general direction from which fire is coming, firing from the hip or shoulder as they move. They do not stop unless hindered by enemy effective fire, at which time they conduct a vigorous assault to knock out the resistance and then continue on.

h. Enemy resistance should be contained by the troops that first contact it and all other troops should push by the resistance and move rapidly toward final objectives. The bulk of the force, in this manner, by unit, should have infiltrated past any enemy that might be engaged by other troops.

i. If the enemy's resistance is such that this infiltration cannot be done, then his positions must be developed and neutralized as in any other attack.

j. When the enemy is contacted in woods, it can be assumed that he is more or less fixed in that his observation is limited and any movement on his part from one point will allow our troops in contact at that point to push on.

k. Speed is essential, and therefore, if it is applied, the enemy in all probability will not use his reserves until he knows definitely our direction of advance.

l. In woods fighting it can be assumed that the enemy will use his reserves for blocking missions rather than for counter-attack missions. Therefore, this again emphasizes the importance of speed in arriving at objectives, even though only part of your force gets there initially.

m. In combating enemy road blocks, plans should be made to attack astride the roads but not on the roads. As in a night operation or amphibious operation, we should seek in our planning to attack terrain and terrain features assuming that these points will be occupied by the enemy.

n. Roads should not be used as boundaries between units. A unit should be given the responsibility of moving astride the road.

INFANTRY-ENGINEER-TANK TEAMS

It was impossible for tanks to advance along any of these roads until the mines were removed by engineers. The usual procedure was for the infantry to attack through the woods on both sides of the road, employing the methods stated above. After the infantry "pinched off" a section of the road, engineer troops (usually a platoon) cleared that section of mines; then the tank platoon moved forward and assisted in the establishment of a road block.

MILITARY NOTES

AROUND THE WORLD

GREAT BRITAIN

The "Meteor," British Jet-Propelled Aircraft:

Evidence indicates that the RAF's "Meteor," first combat-tested jet-propelled aircraft built by one of the United Nations, proved a scourge against the German flying bomb. Originally employed by a squadron of the RAF Fighter Command against the pilotless projectiles in the summer of 1944, the Meteor was found to possess speed superior to that of the bomb.

The Meteor is a twin-engined monoplane of very clean design. It was first flown experimentally in March 1943, since which date production types have been considerably improved.

The light, easily-serviced engine of the Meteor—called the "Squirt" by its pilots—sucks in hundreds of pounds of air which is compressed, heated with burned kerosene, and ejected through the turbine. Thence it escapes through a large rear nozzle. The turbine emits no flame, and only rarely does a smoke trail follow the plane. The passage of a jet plane on the ground leaves in its wake a smell similar to that given off by a hot kerosene stove or a storm lantern.

Pilots praise the Meteor's maneuverability, its facile handling, and the simplicity of its controls. Its landing speed is not excessive, and the vibration attributed to most aircraft appears to be absent.

Pilots say the "Squirt" when warming up or taxiing makes a noise like an oversized vacuum cleaner, but at full throttle the plane sounds about as does a normal aircraft. Ample armor gives the pilot a sense of security from hostile fire.

The Meteor is produced by the Gloster Aircraft Company.

(British Air Ministry release)

British Tanks with 95-mm Howitzer:

Replacing the three-inch howitzer which had previously been used and was becoming obsolescent, the 95-mm howitzer shown in the illustration has been mounted on British



tanks. The 95-mm fires a shell of high capacity filled with either high explosive or smoke, and is capable of "lobbing" it over buildings and hills which obscure the target from the direct view of the tank gunner.

(*The Sphere*, Great Britain)

U. S. S. R.

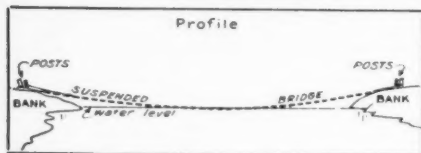
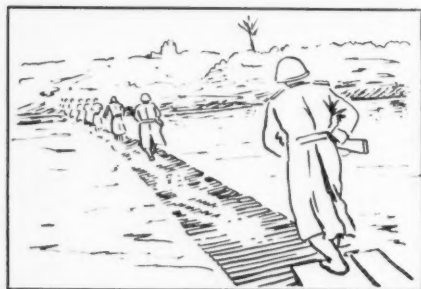
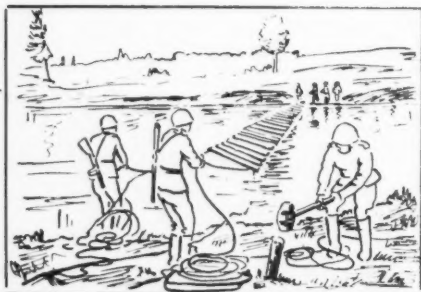
Women's Bomber Regiment:

Under the command of Lieutenant Colonel Evdokia Bershanskaya, a light bomber regiment composed of women volunteer fliers

fought its way from the Caucasus through the Crimea, Byelorussia, and Poland into Germany. Thirteen of its members were awarded the title of Hero of the Soviet Union, and 200 others received various decorations. Colonel Bershanskaya wears the Order of the Red Banner and the Order of Suvorov.

(*Information Bulletin*, Washington
Embassy of the USSR)

Soviet Footbridge:



One type of Soviet footbridge is illustrated in the sketch above. This semi-floating suspension bridge consists of a series of small boards fastened to two ropes of sufficient length to span a small river. Two piles are driven into each bank and the ropes are tied to these. When crossed by soldiers, portions

of the bridge have a tendency to submerge slightly, although the water should have some effect in tightening the rope cables. One great advantage of this hasty-type footbridge is that it is not bulky to transport. It is believed that this bridge has been carried in sections on the backs of infantrymen.

(From an article by Major Robert B.
Rigg in *The Military Engineer*)

INDIA

Indian Artillery:

The introduction of medium batteries marks the latest development in the growth of the Indian Artillery, which since the war has expanded from a few mountain regiments to a large and powerful force embracing almost all types of artillery.

The first of the new Indian medium gunners, mainly Rajputs and Madrassis, are now training hard somewhere in India and being initiated into the service of the 5.5-inch gun.

The regiment of Indian Artillery came into being a few years before the present war, but at the start of the war the Indian Artillery consisted solely of one Indian field artillery regiment. The real strength of the Indian gunners lay in the renowned mountain artillery, which at that time formed part of the Royal Regiment of Artillery and was only later transferred to the new regiment of Indian Artillery.

The Indian Artillery now has its own mountain, field, medium, light and heavy anti-aircraft, antitank, mortar, survey, coast, and searchlight batteries.

Today, all personnel of the Indian Artillery, except for a proportion of British officers and NCO instructors, are Indians. Large artillery training centers have been established and thousands of first-class gunners have been turned out from these centers at Ambala, Muttra, and Mehgaon.

(*Indian Information*)

Oil for China:

After two years of secrecy, American Army headquarters in New Delhi, India, announced that the main portion of a fuel pipe line which

ultimately will reach from Calcutta to China across Burma has been completed. Already the pipe line, the longest military operational line in the world, is used to fill the gigantic tanks of Superfortresses in India, and one of its major tasks is to feed gasoline into the planes ferrying fuel to the Fourteenth Air Force in China.

(Army Ordnance)

GERMANY

Launching V-1 from Airplanes:

After the capture of the flying-bomb sites during the latter half of last year, the bombardment of England was taken over by the Wehrmacht through the medium of the V-2 rocket missile, with spasmodic help from the Luftwaffe which launched a few V-1's from Heinkel He 111 aircraft. Much speculation has been advanced on the method of carrying these bombs, but it is now fairly certain that each He 111 carried a V-1 under the port or starboard wing, with an equivalent balance-weight under the opposite wing. Presumably, the V-1 is launched at the same time as the weight is dropped.

(The Aeroplane, Great Britain)

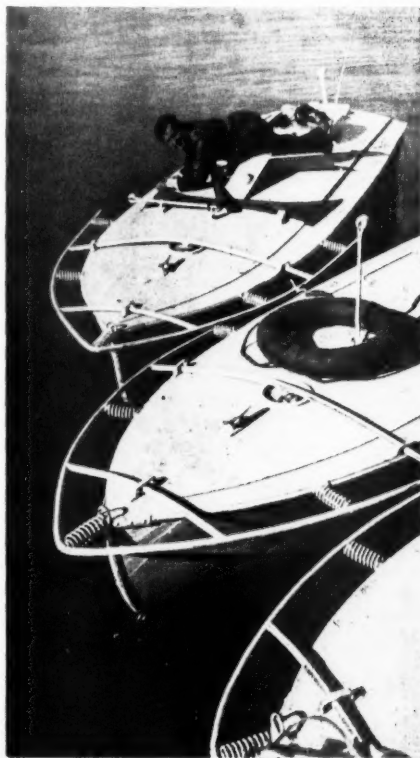
German Explosive Speedboats:

In waters along the coast of Europe where enemy vessels, on account of their proximity to the shore, could not be combatted with naval vessels and submarines, operations were carried on with explosive speedboats like those shown in the picture. In appearance, these small, light wooden racing boats differed but little from a well-built racing boat. They possessed great speed, were not dependent on harbor installations, and could be rolled into the water on any coast.

Around the upper edge of their bow they had a spring-supported framework electrically connected with the detonating charge. When the boat was ready for the attack and the detonating device was set, a bump against the framework sufficed to set off the explosive charge, which weighed several hundred pounds and filled about a quarter of the boat. The force of the explosion was more than

even the heaviest ship's armor could withstand.

The explosive boats, whose main forte was their speed and low visibility at night, were always operated in packs in order to render it difficult for the enemy defense to achieve concentration of fire and to make it difficult for the target to escape them.



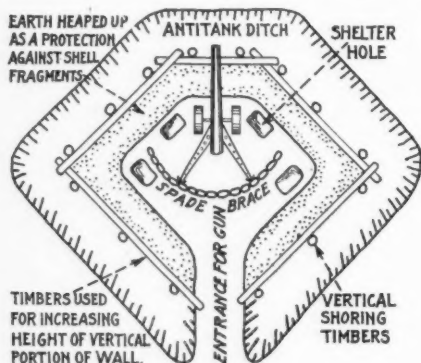
They were accompanied by a command boat with an officer or technical sergeant who was in tactical charge of them, and who designated the targets and gave the orders to attack. When the boat was headed for the target, the pilot set the detonating device, locked the steering gear in position, and let the boat drive at top speed toward the target, while he himself leaped backward into the water to be fished out by the command boat which was

following. Under his leather coveralls he wore a garment which generated warmth in water, and he was also provided with a night lantern, a one-man pneumatic raft, a life-jacket, and emergency rations.

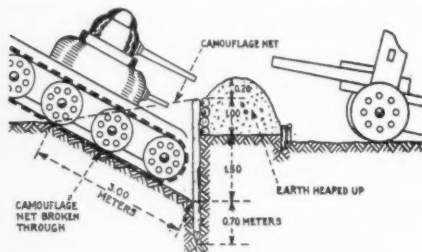
(Digested from *Signal*,
Berlin, No. 2, 1945)

Emplacements for Light Field Howitzers:

Experience has shown that when a gun is partly dug in to about the height of the barrel, the earth used as a protective wall



does not offer any effective protection against being rolled over by enemy tanks. Such protection is afforded, however, when the gun emplacement is built in the manner shown in the sketches. The gun remains on the natural



surface of the ground while around it an anti-tank ditch is dug, and the excavated earth is used for protection against shell fragments.

The entrance for the gun must be as narrow as possible. In case of a threatened tank attack, this entrance is to be blocked by means of mines.

(*Artilleristische Rundschau*)

Operational Technique of the Me 163 Komet:

The Messerschmitt Me 163b Komet employs a unique operational technique. It is intended primarily to oppose large formations of daylight bombers, although it has likewise been encountered by night-flying Lancasters and Halifaxes.

A liquid-rocket unit with a duration of about seven to ten minutes, believed to burn liquid oxygen, hydrogen peroxide, and calcium permanganate, propels the Me 163b at a maximum speed in excess of 600 miles per hour. Such an exceptional velocity is only employed in dire necessity.

As bomber formations approach the Komet bases, the little oddities take off, jettison their undercarriage, and proceed to climb at rates of about 10,000 feet a minute. Once above the bombers, power is stopped and gliding commences. When in a favorable position, each Komet employs power to attack the bombers. Accuracy of aim and destructive shooting are almost impossible at such high speeds, with the result that the new technique has to a large extent failed. Any considerable multiplication of the numbers of attackers might, however, prove serious.

Tactical conditions inevitably influence the form of interception described above, and on occasions the Komets prefer to attack at the top of their climb, using power throughout. The danger in this method lies in the likelihood of exhausting all fuel while still in the vicinity of a lively fighter escort. Allied pilots usually attempt interception as soon as the Me 163's are observed so that they are kept on the run. As their brief duration aloft nears its end, the German pilots usually attempt a rapid withdrawal, and thus fail to hamper seriously the bombing attacks.

Only men of unusual physical stamina are capable of flying Komets. To accustom them

to such an unusual mount, a special training version, known as the Me 163a, is used. Often it is towed into the air by Me 110 twin-

engined fighters before the rocket unit is ignited.

(*The Aeroplane*, Great Britain)

JAPAN

"Tony":



"Tony" was the first Japanese airplane to have an inverted-Vee liquid-cooled engine and built-in armor plate. It is an Army single-seat fighter type 3 by Kawasaki. Because of its DB-type engine and its resemblance to the Me 109, it was probably responsible for the report that German airplanes were operating with the Japanese. In fact, there has been no authentic incident of any German airplane operating with the Japanese in spite of the fact that code names were at

one time given to the main German operational types in anticipation of their being met with in this theater.

"Tony" has two 7.7-mm or 12.7-mm guns firing from the engine cowling, and two 12.7-mm or 20-mm cannon in the wings. Maximum speed: 356 miles per hour (309 knots) at 17,000 feet. Span: thirty-nine feet four inches. Length: thirty-eight feet nine inches.

(*Aircraft Recognition*, Great Britain)

UNITED STATES

Arm Splint from Ammunition Containers:

The 105-mm shell container is well suited for improvising splints for the temporary splinting of fractures of the arm and forearm. The materials are available in any forward area; adaptation of the shell case is simple; the container is rigid enough to protect the injured member during evacuation; the splint is light in weight; the arm does not need to be cradled in a muslin bandage as with the ring splint; the length is readily adjustable; and being expendable, it is one less item on property exchange. The metal and plywood retaining rings in the center of the case can be loosened by a sharp blow, freeing either or both lining cylinders from the outer shell of the tube, and the rings can be removed. Either lining cylinder can be fixed at any desired position in the outer cylinder by a single turn of adhesive.

To apply this splint is no more tedious than to apply the standard arm splint.

(*Bulletin of the U.S. Army Medical Department*)

Waterproof Matches:

Water-resistant matches, which not only light in damp weather but which can be immersed in water for as long as six hours and still light, have been procured by the Quartermaster Corps.

The match resembles the standard kitchen match, but its tip and part of the wooden stem have been dipped in a waterproof lacquer. The new matches are a boon to soldiers in water-soaked foxholes and humid jungles.

(*Army and Navy Register*)

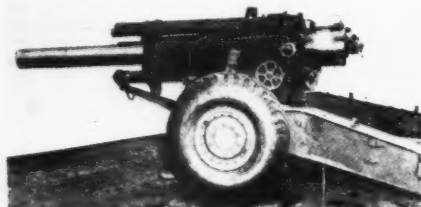
Protection against Flashburns:

Soldiers using bazookas and flame throwers, as well as tank crews, are protected against flashburns by a new cream issued to them by the Quartermaster Corps. The cream, which comes in a pocket-size container, does not possess any medical properties and will not cure burns. Its prime function is to provide a "fireproof" protection for exposed parts of the body against burns from sudden flashes of flame.

(*Science News Letter*)

New 155-mm Howitzer:

The new 155-mm howitzer M1 is superior to the World War I type in many important respects. It still fires a projectile weighing



THE 155-MM HOWITZER IN FIRING POSITION AT ZERO DEGREES ELEVATION.

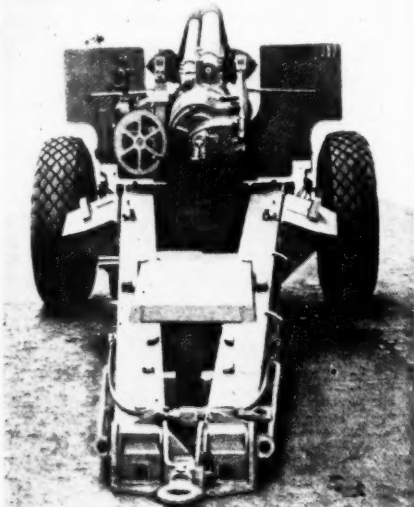
approximately ninety-five pounds, but the form of the projectile has been improved ballistically. This change in form, together with other ballistic improvements, has increased the accuracy at all ranges. The maximum range of the new howitzer is approximately nine and a half miles, or about one-third greater than the earlier types. The corresponding German and Japanese howitzers are outranged by substantial margins.

The new howitzer has a split trail, permitting a forty-nine degree traverse as compared with the single trail on the World War I type with only a six degree traverse.

The elevation has been increased from forty-two to sixty-five degrees to clear obstacles and to secure the maximum advantage from plunging fire on the relatively soft overhead covering of dugouts, pillboxes, and bunkers. Stability has been improved by use of a variable type of hydropneumatic recoil mechanism which permits longer recoil

and more gradual absorption of firing stresses at the lower angles of elevation.

The new 155-mm howitzer was designed for high-speed transport both on highways and across country. The gun, recoil mechanism, and carriage are locked together for traveling as one integral unit and transported as a semitrail load behind a high-speed prime



REAR VIEW OF THE 155-MM HOWITZER IN TRAVELING POSITION SHOWING THE SPLIT TRAILS.

mover. Another novel feature of the fire-control system is a device for lighting the scales and reticle of the telescope for night firing. The light source is a tiny bulb operating from a small dry-cell battery.

(*Army Ordnance*)

New Heavy Tank, M-26:

The Tank, Heavy, M-26, the 43-ton General Pershing, is armed with a 90-mm gun, two .30-caliber machine guns, and one .50-caliber machine gun. The power plant consists of a 500-horsepower, V-8, liquid-cooled gasoline engine, which carries it at a highway speed of twenty-five miles per hour. Frontal armor is four inches in thickness, the angle at which it is placed resulting in an actual head-on thickness of 6.9 inches.

(*Army and Navy Journal*)

FOREIGN MILITARY DIGESTS

Japanese Morale

Digested at the Command and General Staff School from Supplement No. 1 to
Army Training Memoranda 1944 (Great Britain).

THE object of this article is to show the nature of Japanese morale and fighting spirit, how they have been established, and what can be done about them. The Japanese is much less well equipped than we are, and he has no chance whatever against the combined resources of the British Empire and the United States. What makes him a troublesome enemy is that, *given the right circumstances*, he is a very tough and determined fighter. The whole art of fighting him lies in knowing how to avoid his strengths and exploit his weaknesses.

In general, the Japanese has the same basic inborn "instincts" as the British, the Americans, and all other human beings.

Beyond a certain point, however, the effect of our upbringing and education upon our adult ideas is largely accidental. The Western child is taught certain rigid rules of conduct and thought—for example, that he must not steal; but a great deal of scope is left for the development of individual opinions and ways of life. The education of the Japanese, on the other hand, is a deliberate attempt to produce certain exact results, and the greatest possible uniformity. Rigid rules of conduct are laid down even in the most detailed matters—for example, exactly how to sit and how to speak to various classes of people. Above all, how and what to think, and even what to feel, are most carefully prescribed and taught. The whole object is to produce an adult who conforms exactly to the prescribed pattern of Japanese life, and any

sign of "difference" from this pattern, or of marked individuality, is rigidly suppressed.

This early training is not only carried out with the greatest thoroughness but also with the greatest consistency of aim. From the time when he ceases to be a baby until he becomes so old that the normal rules of conduct no longer apply to him, the Japanese is always being taught the same lessons. Herein lies much of the strength of the system. The rules of conduct within the family circle or at school are a reflection, in miniature, of the rules of conduct within the State. The Japanese know, with far more precision than most Western races, exactly what results their education and upbringing are seeking to produce, and the whole system is unswervingly directed to the same end.

The virtues most admired and taught are implicit obedience and loyalty to superiors in all circumstances; devotion to duty, to country, and to Emperor; and complete willingness on the part of the individual to lay down his life not only willingly but joyfully for these concepts. From early childhood the Japanese is taught that *as an individual* he is of no importance whatever. His importance lies in being a member of his family unit, and through that family unit, a drop in the eternal stream of Japanese life. He is taught that his country was divinely created and will endure for ever; that his Emperor is a direct descendant of the gods; and that the Japanese race and way of life are unique and incomparably superior to

any other. His death is of no importance, since his spirit will continue to live among his family and his people, and, if he has died worthily, to be revered by them.

When the Westernization of Japan started and she began to enter world markets, her contacts with the Western world inevitably brought with them newer and more liberal ideas which cut across the traditional doctrine of obedience and submissiveness, and, in doing so, threatened the position of the militarists. The poorer class Japanese became restless under their poverty and lack of liberty, and there were peasant riots and strikes.

It was then that the militarists took the underlying anger and restlessness and turned it away from themselves and towards other nations. They dug up and refurbished all the old traditions of Japan; they glorified the old Japanese military virtues; and they taught the people of Japan that their troubles were brought about by the Western nations, who were denying Japan her natural rights.

There is a clear parallel between this tendency and that of the Nazis. But one vital point should be remembered. To the German, much of this doctrine is, in many ways, new and experimental. To the Japanese, most of it, in general principle if not in all its details, is a doctrine with centuries of tradition and success behind it. Its main principles are not merely a political theory which has been foisted on him in recent years, but an extension and intensification of the beliefs of hundreds of years.

It will be seen, therefore, that in many respects, *all* Japanese education is "military training" in so far as it glorifies and teaches the military virtues, and, indeed, includes training at school in military subjects. At home and at school, privately and publicly, by both lay and religious authorities, the Japanese has been taught by every means of persuasion, suggestion, and propaganda to follow a line of conduct that is essentially "soldierly," and to value virtues that are of great military importance. The persistence, thoroughness, and care of this teaching have given him an unquestioning belief in its

correctness, and have made the following of it almost second nature.

It is primarily these facts which make the Japanese a dangerous opponent. From the technical military point of view he is often quite inferior. He is far less well equipped than we are. Physically, though tough, he is by no means a superman. He is, on the whole, smaller and less powerfully built than the Westerner, and the stories of his ability to live and fight on "a handful of rice a day," or to march enormous distances without fatigue, are nonsense. The Japanese is no more immune to hunger and fatigue than anyone else. If he displays great endurance, it is not because of any physical peculiarity, but because he has the *will* to endure. Japanese military strength lies in the morale of the Japanese service man; and that morale in turn is founded on what he has been taught from childhood.

Fortunately, however, the Japanese system has two marked limitations and sources of weakness.

First, the Japanese is a human being, and however carefully he may be taught and indoctrinated, the results are liable to be imperfect. If he really absorbed and completely accepted everything that the system set out to teach him, his morale would be virtually unassailable. But in fact, as with most systems of indoctrination, there may be a more or less considerable difference between what the Japanese is officially supposed to think and do, and what he thinks and does in practice.

Secondly, although what the Japanese is taught tends to make him an excellent soldier in some ways, it is liable to be something of a handicap in others. The very fact that he is taught to respond unquestioningly and almost automatically to many sets of circumstances tends to mean that when confronted by the unusual, to which he has been taught no automatic response, he is liable to be disconcerted. The suppression of his individuality and initiative have left him with little flexibility or capacity for rapid improvisation.

In short, the weaknesses of the Japanese

system of indoctrination are, first, that the system may sometimes demand more from the man than flesh and blood can or will bear; and secondly, that while it makes him an excellent soldier in certain more or less "formal" circumstances, it does so at the expense of making him rather a bad and inflexible soldier in others less formal. What follows is an attempt to show how these weaknesses may appear, and may be exploited in practice.

One of the main failings of the Japanese system is that it tends to ask too much from the individual, both physically and mentally, and to require him to act as though the Japanese were a superman, instead of a mere man trying to be one. There is a limit beyond which his body and mind will not go, even with the most thorough training. The inability of his commanders to recognize this limit is an exploitable weakness.

Many-times in the present war the Japanese command has asked more from its troops than men could give, and starvation, exhaustion, and disease have then done more to defeat the Japanese than any mere force of arms could have done; for example, in Hollandia and other areas in New Guinea.

It is important to realize, however, that though the Japanese, like everyone else, may be defeated by having his supplies cut off, he cannot, as a rule, be defeated by a mere threat of being cut off. The intention must be the completely realistic one of starving him and exhausting his ammunition supplies, and not merely putting him in a position which, in theory, is untenable. With the Japanese, lines of communications tend to be an Achilles heel; he is often somewhat careless about them, and liable to try to operate on a very sketchy supply system, as though trying to make morale and fighting spirit a substitute for food and ammunition.

Like everyone else, he is depressed by finding himself always fighting at a disadvantage as touching the amount and quality of his equipment. Beneath his superficial assumption of superiority over the Westerner there lies, in fact, a deep sense of inferiority and uncertainty. His leaders have

worked very hard to overcome this feeling, and to impress on him that to fight at such a disadvantage should be a source of pride. The Japanese, it is implied, is not dependent upon mere machines and material resources; he has the far more important asset of superior spirit. This is one of the directions in which propaganda has been asked to do too much. The Japanese may repeat these sayings, and even write them obediently in his diary. But they do not save him from being depressed when he finds material resources overwhelming him. The effect is cumulative. He will probably fight well for a time—perhaps a long time—against greatly superior equipment. But gradually the fact that all the soldierly spirit in the world won't bring down an enemy aircraft without the help of an antiaircraft gun or a fighter becomes more and more apparent.

Like any other human being brought up under a system in which there is little freedom of speech and criticism, the Japanese is a chronic rumor-monger. The wildest rumors often spread among Japanese troops—usually of a hopelessly over-optimistic kind. It is questionable whether these rumors are not often officially propagated to raise morale. But whether they are or not, the Japanese is human enough to be disappointed and angry when they turn out to be untrue; and they undoubtedly do a good deal to corrode his strongest weapon—his faith.

The Japanese, like everybody else, dislikes rain; but that does not mean that he will not carry on operations in rainy weather. On the contrary, he is extremely proud of his willingness to do so, which he regards as a particular sign of high morale, and there is evidence that it is a considerable shock to his confidence to find that we, too, are not purely fine-weather soldiers. This is an example of the ways in which Japanese confidence may be diminished merely by the falsification of the picture that propaganda has presented to him.

Contrary to statements that have frequently been made, the Japanese is not "at home" in the jungle. The Japanese are not a tropical people, and as a race they are no

better fitted for jungle fighting than we are. They were better jungle fighters than we were at the beginning of the Far Eastern war because they had been better trained for the job.

Finally, the Japanese is a chronic sufferer from that very common disease of military nations, rashness; which grows from overconfidence. The insistence of Japanese teaching on the superiority of the Japanese soldier is superimposed on a sense of inferiority and a rather childish desire to achieve the spectacular. As a result, the Japanese, from a military point of view, is rather apt to lose sight of what is and what is not a practical proposition, and to place altogether too much faith in what can be achieved by mere willingness to try hard.

Thus, the Japanese tends to overrate his abilities, both absolutely and relative to his enemy, and hence to overreach himself. The ordinary difficulties, dangers, and discomforts of a campaign are emphatically *not* enough to have a significant effect on Japanese morale. It is only when a whole series of events happen to falsify all he has been taught about himself or the enemy that he may begin to lose his faith.

Statements that the Japanese "can't stand mortars," or "panics when shelled," or "won't face the bayonet," or is unusually affected by some particular weapon, should be accepted only with the greatest reserve. It cannot be stated too strongly that there is no convincing evidence of a general, unusual, and significant fear of any particular weapon that is peculiar to the Japanese. The point is rather that his "likes and dislikes" amongst weapons appear to be fairly normal, and only what one would expect from any troops of high morale.

On the other hand, his reactions to certain circumstances are definitely not "normal" by our standards, and most reported instances of undue sensitiveness to the use of certain weapons prove, on examination, to be reactions to the circumstances of the attack. Thus, when we hear that the Japanese is liable to panic if mortar fire is brought down on him suddenly, the operative part is not

the fact that it was mortar fire. He will put up with that well enough in other circumstances. The important point is that it was *sudden*. The cardinal fact that emerges is that the Japanese, if he is physically capable of doing so, will usually fight with the greatest stubbornness and tenacity in any "*set piece*" formal battle, in which his job, however difficult, is clear-cut and obvious. It will usually apply however much he may be outnumbered, and however hopeless his tactical position. But, conversely, if surprised, "*caught on one leg*," or in any position that calls for hasty decision, improvisation, or change of plan, he will often perform quite surprisingly badly. Thus, a platoon of Japanese in a dug-in position will often fight to the death against overwhelming odds, even if completely cut off. But the same platoon, if ambushed, may panic or react very stupidly and slowly. This tendency can be traced to early training. This rigidity is the price that he has to pay for his reliance upon set rules of conduct; and it represents the characteristic feature of Japanese morale. The Japanese is trained to an extremely high sense of duty, and as long as he sees what he is called upon to do, he will do it. But when there is, so to speak, "nothing in the book" to cover the circumstances in which he finds himself, he is generally at a loss.

It must not be thought, however, that because of this characteristic the Japanese always lacks enterprise, cunning, and initiative. When individual enterprise is obviously appropriate—for example, in an infiltrating action—he may display much of it. It is in *unexpected circumstances imposed on him by the enemy* that his weakness appears.

In connection with the use of surprise and the unexpected, a word is necessary about the use of bluff and deception. He is not a very good subject for a straightforward bluff. He is far more likely to make mistakes through ignoring a real danger than through being bluffed by an empty threat. The point is well illustrated by his reaction (or absence of reaction) to the operations of air-transported troops across his lines of communications during his advance on Imphal.

His mistake was not undue nervousness, but overconfidence and refusal to alter his plan when there was a genuine reason for doing so.

This obstinate persistence in a plan that has gone wrong is characteristic not only of his strategy but of his minor tactics. It should be borne in mind, however, if advantage is to be taken of the Japanese tendency to attempt the impossible, that both the Japanese command and the individual soldier will make extraordinary sacrifices to achieve an object.

It should be remembered that the Japanese is not only willing to "die for the Emperor" but sets a great value on dying with spec-

tacular glory and self-sacrifice in some suicidal "David and Goliath" exploit. Although this sense of glory may cause him heavy losses, it may also cause considerable trouble to his opponent.

In general, the Japanese concept of war is a comparatively simple and primitive one. His strength lies in his belief that war is simply the working out of a divine pattern, with a Japanese victory as its inevitable conclusion. He may panic when surprised and disconcerted, but otherwise it is only when he begins to see a flaw in the pattern which is not only local but unmistakably general that his fighting spirit is likely to be seriously lowered.

Military Doctrine of the Red Army

Translated and digested at the Command and General Staff School from a Russian article by Brigadier General N. E. Chibisov in *Krasnaia Zvezda* (Red Star) 12 November 1944.

ONE characteristic of Soviet military science consists in the fact that it maintains a close contact with practice and embodies the most progressive of ideas. Any innovation developed during the course of operations is carefully studied, tested in action, and made the common property of our armed forces. Incessant search for the most suitable forms of combat and for the best methods of utilizing our technical means, and inculcation of new tactical methods—these are activities that are characteristic of our officers.

The effectiveness of our tactics is determined by many factors, especially by the fact that they are based on a careful study of the weak and strong points of the enemy. Suvorov's legacy, "Know your enemy thoroughly; be acquainted with his weapons and the ways in which he makes use of them; know his strong and his weak points," has acquired a still greater significance in our times. With the mobile warfare that prevails today, it is difficult to gain a victory without the ability to foresee the course of events. As is also well known, foresight is not guesswork or reliance on a lucky break. It requires a careful consideration of all the

elements of a situation, and particularly the possession of complete information of the enemy.

There have been developed, in the course of the present conflict, important principles governing the organization and conduct of reconnaissance, which essentially may be summed up as follows: always operate in an active manner; bear in mind that only by means of action is it possible to compel the enemy to reveal his strength; conduct uninterrupted reconnaissance day and night over a wide extent of the front, concentrating the greatest effort in the direction of the main attack.

In the application of these principles it has been necessary to conform to the basic requirements of our tactics, namely, of inflicting simultaneous blows over the entire depth of the enemy's defense. For this reason, our first task has been the search for new methods of obtaining information about the enemy when his combat dispositions are deeply echeloned. On the other hand, it has become more clearly evident than ever that reconnaissance missions in present-day operations cannot be taken care of by the recon-

naissance elements set forth in our tables of organization. Our motto, "Not a step without reconnaissance," has come to require a more careful organization of special reconnaissance operations, more skill in effecting penetrations into the enemy's rear areas, proper employment of radio and of ground and air photography, well-organized observation, reconnaissance in force, etc.

The results of this revamping of our system have not been slow in manifesting themselves. The number of prisoners taken by our reconnaissance elements has increased and, as a result, knowledge of the enemy has become more complete at regimental and divisional headquarters. This is what the commander of the German 82d Infantry Division had to say about our scouts in one of his orders: "The Russian possesses the eyes of the lynx, the stealth of the marten, the sense of smell of the wolf, the ears of the fox. He does not attack as we do, breaking his way through obstacles by the employment of 'blitz' methods, but advances unseen, crawling hundreds of meters on the ground and waiting for hours for his opportunity to strike."

The basis of our military doctrine is that victory can only be obtained by the resolute attack culminating in the encirclement and destruction of the enemy's manpower and matériel. This doctrine has been successfully embodied in the operations of the present war. "Only by blows of constantly increasing intensity can the enemy's resistance be broken and final victory be achieved" (Stalin).

In military science, especially in matters pertaining to pursuit operations, there are certain fundamental principles that remain constant throughout the course of the centuries. Even Epaminondas at Leuctra applied a tactical principle—the unequal distribution of forces over a front with a view to concentrating them for the main attack in the decisive direction. Hannibal, by means of a skilful grouping of his forces, was able even with weak forces to encircle the enemy at Cannae. Brilliant examples of the regrouping of forces were shown by our

great military genius, Suvorov. But, as is well known, never in the history of war have there been battles in which such enormous forces participated as in the present war. In addition to this, attack operations develop over vast expanses of front and continue without a break throughout the course of many months. Under such conditions, only he can win who knows how to build up the strength of his blows, how to maneuver his reserves skilfully, and how to make correct use of his technical equipment. Be stronger than the enemy where the blow is struck and at the moment when it is struck—this is a fundamental principle both in the planning of large operations and in the organization of those of a tactical magnitude.

This effort always to be stronger than the enemy at the moment when the blow is struck is usually clearly evident in our breakthroughs of German defenses. In several instances, the density of concentration of our forces and equipment reached the following figures: in the breakthrough sector, there were concentrated over 300 artillery pieces and mortars and as many as sixty tanks and self-propelled guns over one kilometer of front. The former norm of a threefold superiority of the forces of the attacker over those of the defender was far surpassed. Suffice it to recall that in the first World War there were never more than 160 guns per kilometer of front.

In spite of this, there is one important point that should be taken into account. This overwhelming superiority in a breakthrough sector is attained under the conditions of a general parity of forces or, at times, even of numerical inferiority over the front as a whole, for it is a bold concentration of forces in the decisive direction that permits our commanders to deliver irresistible blows on the enemy and shatter his most formidable defenses.

The Germans, attempting to stabilize their defense positions, have been obliged, during the course of the war, to make substantial changes in their tactics. The fact is that their defense system, having been based in the main on centers of resistance [localities],

was not able to hold out against our forces, which had developed great skill in maneuver. Our infantry boldly penetrated between their strongpoints, fanned out to the flanks of the enemy and into his rear, and attacked his defenses at their most vulnerable points.

During last year, the Germans began to give their preference to defenses based on systems of trenches. Let us note that, first, the Germans had attempted to build up a continuous front in order to reduce the opportunities for our wedging into their defense dispositions. Second, they figured that our forces would be compelled to disperse their fires over broad and deeply echeloned targets, which would reduce their intensity. As our forces approached German soil, the strength of the German positions gradually increased. In the vicinity of the East Prussian frontier and in Poland, they hurriedly created fortified zones constructed in accordance with the specifications for permanent fortifications.

The breakthrough of deeply echeloned German defenses based on a system of trenches and permanent fortifications required the development of new battle formations and new methods in the utilization of our matériel. The important principle here is to disrupt the front of the enemy's defense and create open flanks in his dispositions. This permits the attacker to employ such forms of maneuver as envelopment, turning movement, disruption of the enemy's communications, and encirclement.

The success of a breakthrough is assured by cooperation on the part of all participating arms. In this respect, Soviet tactics also embody a large number of new methods. Up to the time of the present war, the theory existed that it sufficed, for assuring the success of the attack, merely to disrupt the enemy's system of fire. Practical experience, however, has revealed the fallacy of this theory. Modern defense possesses great tenacity, and the ability of our forces to break through it is due mainly to the fact that our artillery and aviation deliver a simultaneous blow on the enemy's fortifications, neutralizing or completely destroying all the weapon

emplacements in the tactical zone of his defense.

At the time of the artillery preparation, all the attention of the various commanders is centered on the task of avoiding the dangerous gap between the end of the artillery preparation and the beginning of the infantry assault. Toward the end of the artillery preparation the intensity of the fire increases, culminating in an outburst of fire of utmost intensity. At this moment, the tanks and the infantry are approaching the wall of the artillery fire (the tanks at a distance of eighty to a hundred meters; the infantry at a distance of 150 to 200 meters). A considerable number of pieces using direct fires, including large-caliber artillery, and also 120-mm mortars, are employed for the destruction of the various sectors of trenches and concrete and earth-and-timber weapon emplacements. The fire of these guns and mortars, directed at the junction points of trenches and communication passages, creates obstructions which greatly hamper concealed maneuver by the enemy forces.

We may unqualifiedly state that in no army have direct-fire pieces ever possessed such broad application as with us. Suffice it to say that in certain breakthrough sectors as many as ninety per kilometer of front have been employed. The further perfection of this mode of employing artillery opens new perspectives in the development of close combat.

One of the most important missions confronting the forces fighting in the depth of a modern defensive position is the repulse of counterattacks by the enemy. The experiences of many battles reveals that the Germans, in the effort to reestablish their defense, throw into the fight all the forces and means available to them, including even specialized units and personnel of the services. Their infantry counterattacks are supported by large numbers of tanks and by powerful artillery and mortar fire, and are covered by their air force.

The main factor determining the success of breakthrough operations is rapidity of tempo in the attack. It is assured, first of all,

by the element of surprise in the blow aimed at the simultaneous crushing of the entire depth of the defense. This is followed by unbroken and massed accompaniment of the infantry by the fire of the artillery and tanks. The commitment of the second and succeeding echelons, when the results of the fighting for the first position has been ascertained (with the complete liquidation of the enemy in the trenches of this position), eliminates pauses and facilitates the impetuosity of the forward movement.

We should call attention to one more point that is characteristic of the operations of the various units of the Red Army. It is well known that the tactics of our attacking forces include the utilization of weak spots in the enemy's defenses, following this by blows on his flanks and rear. With regard to this mode of action, it is commonly said: "If you cannot break open the door—crawl through a window." But just as in a house there may be sturdy partitions, so also in his defense the enemy may construct formidable screening positions and create the threat of counterattacks from different directions. In addition to this, in the case of narrow wedges, maneuver is impeded and the employment of heavy equipment is rendered difficult, and the more so since the "weak" sectors of the defense are located, as a rule, in hardly accessible areas. Our commanders have a high esteem for maneuver, but never do they maneuver for maneuver's sake. If need be, a blow is delivered not on a weak point but on the strongest point. For this purpose a great quantity of matériel is concentrated. As under the blows of a heavy hammer the partitions of a house are broken down, so also under the powerful action of modern technical equipment the sturdy centers of German defense are destroyed.

Since ancient times it has been known

that complete destruction of the enemy following a successful attack is achieved in pursuit. One must not give the enemy who has been defeated in the first phase of the action an opportunity to organize his forces on another position. Heavy use of mobile forces permits the enemy to intensify his efforts in those sectors in which a considerable threat has developed for him. If the attacker permits the loss of even an insignificant amount of time, he will find himself faced again with a formidable, though hurriedly organized, defense line.

The Red Army carries out its pursuit operations in extremely rapid tempo, utilizing modern technical equipment to the maximum extent. Avoiding protracted actions with the rear guards of the enemy, our mobile forces forge ahead to the flanks of the enemy's main body of forces and penetrate through to his rear areas. Soviet forces also conduct parallel pursuit, delivering successive blows on retreating enemy columns. In the final count, this usually leads to encirclement of the enemy. A classic example of this is to be found in the operations which occurred during the past summer in White Russia. Here our forces anticipated the enemy at all the defense lines which he had established far in the rear areas, and totally defeated the central group of enemy forces.

In the tactics of our armies, there exists no stereotyped pattern, since all our officers are innovators. They skilfully conduct operations in accordance with established methods or boldly cast them aside when these methods begin to hamper forward movement.

Constant generalization of modern experience, and its resolute application—this constitutes the security for the further development of the military mastery of the Red Army.

It is as unfair to lavish recognition as it is to deny it to those that deserve it.

—General José de San Martín, quoted in
Revista Militar, Argentina

The Air War in Southeast Asia

Digested at the Command and General Staff School from an article in
The Royal Air Force Quarterly (Great Britain) March 1945.

THE campaigns which on land have witnessed the defeat of an ambitious Japanese attempt to invade India and the return of Allied armies over the Burmese frontier to the gates of Mandalay (see sketch) have not passed without momentous developments in the air war. Indeed, the progress of the war in the air over the Burma front has been intimately connected with the land campaign, one reacting upon the other as mutual cause and effect, a progress of which some explanation will be offered in the following pages. Conditions vary greatly from those usual in Europe. Aircraft in operational service are in type some six to twelve months behind those of the metropolitan air force, and in number very much less; they operate from widely scattered bases that with great labor have been improvised in a countryside that hardly varies from Arakan to Assam in its unfavorable climate and tenuous communications by land and water alike. For purely logistic reasons it might be doubted whether, even if unlimited reinforcements were available, the numbers of aircraft actually operating could be proportionally increased; of this also something will be said later.

Flying conditions also have something new to offer. Navigational aids, though increasing, are still comparatively few; maps are often skimpy and unreliable, and landing grounds are by no means so conveniently numerous as at home. For the greater part of the year there is indeed a sky which over the plains is rarely clouded; but most operational flying takes Allied aircraft eastwards from their bases in Bengal and Assam over the wild jungle-clad hills that rise to eight and ten thousand feet and separate India from Burma. Cloud may be met here at all times of the year, but during the four monsoon months in particular these mountains are a home of violent storms and squalls that constitute a considerable flying hazard to crews, and not the least achievement of the

present campaign is the acquisition of air bases on the Burmese plains beyond them.

What follows should in no way be judged as a summary of events; it is merely an attempt to select from the pattern of developments the most significant strands in a period marked by a notable degree of co-operation between the RAF and the U.S. AAF, whose units have mingled under mutual operational control to meet the changing needs of the tactical situation. The co-ordinating authority for Allied air operations on the Burma front rests with the Eastern Air Command under Air Command, Southeast Asia; the headquarters of each is an integrated unit comprising both British and American personnel.

During the campaign of 1942-43, and for a few weeks at the close of the monsoon in 1943, Allied air superiority over the Burma front was contested on not very unequal terms by the Japanese, whose Oscars proved tough opponents for the Hurricane to tackle and whose Dinahs outflew the latter to make reconnaissance flights over our forward areas with impunity. The final establishment of Allied air supremacy was marked by two milestones. The first in point of time was the advent of Spitfires at the beginning of November 1943. Within a fortnight they had shot down three successive Dinahs, and during the next four months not one Japanese reconnaissance aircraft succeeded in covering our forward bases. A series of air battles subsequently developed in which the Japanese scored one success by a daring daylight raid on Calcutta on 5 December, as a result of which the timorous coolie population could not fully be induced to resume work at the docks for some weeks; but before the end of January 1944 the Spitfires had accounted for some forty-four aircraft with another thirteen probably destroyed and forty-nine damaged, for the loss of seven. These figures require no comment.

The second milestone was reached in the

opening months of 1944 when long-range fighters of the 10th U.S. AAF and of the 1st Air Commando Group—Lightnings (P-38) and Mustangs (P-51)—began to operate in force. The Spitfires had taught the enemy severely to restrict the offensive use of his aircraft and he had practically ceased as a result to make use by day of his bombers over our lines, while his fighters seldom attempted to make deep penetrations. The long-range fighters were now able to seek him out on his own airfields and, owing to the embryonic nature of the Japanese warning system, they were often in a position to attack his aircraft before they could become airborne. During a series of sweeps over the main enemy air bases in northern Burma in March and April [1944] they destroyed or probably destroyed well over a hundred aircraft caught on the ground, in addition to another seventy-six in aerial combat. It is very possible that the enemy squadrons thus handled had been brought up specially to support the ground offensive then being aimed at Imphal and Dimapur. It was in any case a serious blow to the enemy, who disposed of considerably less than three hundred aircraft for operations in Burma at this time. A major result was that he was forced to withdraw his fighters to the Rangoon area, so the Japanese air support operations during the siege of Imphal were conducted from bases some five or six hundred miles distant from the front; his forward airfields—which had been constructed in abundance—were used under cover of elaborate camouflage and dispersal arrangements merely as advanced refuelling stations and emergency landing grounds.

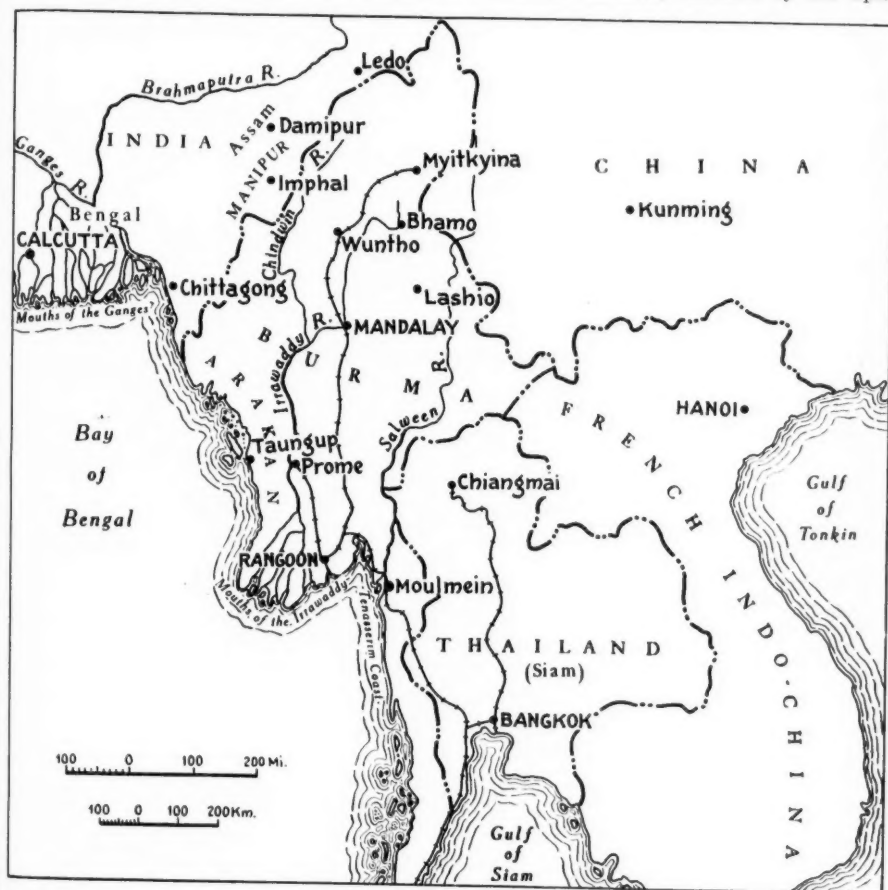
Frequent and regular sweeps continued throughout the year over the enemy forward airfields with generally a marked absence of enemy aircraft to report. In October and November a further stage in the enforcement of Allied air supremacy was reached when a series of large-scale fighter attacks, in each of which up to ninety long-range fighters took part, was directed against the main base airfields of the enemy in the Rangoon area; in the course of these oper-

ations some three dozen enemy aircraft were destroyed or probably destroyed in the air or on the ground, for the loss of four. While the Japanese still attempt sporadic raids, generally by small elements operating under cover of cloud or darkness against the most advanced Allied outposts, nevertheless the Allied forces in the field fight with the assurance that the enemy interference is unlikely to be more than momentary and slight. From the air point of view, the Allied air superiority has made it possible to deploy and operate to maximum advantage the other weapons in the Allied air armor—bomber, transport, and direct-support aircraft. To the achievements of these, some attention will now be given.

Although such direct support as was possible with the available aircraft had from the beginning been afforded to the ground troops, it was not until the campaigning season of 1943-44 that the Allied air forces were in a position to afford that measure of aid required by contemporary developments in the art of war and by the nature of the terrain across which the contending armies faced each other. Operations in the field were thenceforth invariably preceded by the attacks of fighter bombers. The squadrons engaged in this work developed great accuracy of aim, their targets being known in the case of the most skilled to have been set as close as thirty yards from Allied outposts, and they secured evidence as to the efficacy of their attacks from both sides—from the Japanese, by the readiness with which they evacuated positions that had been bombed and by the dread with which they confessed in their diaries to be filled by these assaults, and from our own forces by the frequent signals of appreciation that they subsequently received from forward units. During the operations to clear the enemy from Manipur, when their bases were close behind the front line, their work was specially effective. On one solemn occasion the commander of a Gurkha battalion formally presented to a supporting fighter-bomber squadron two trophies—as a token of gratitude.

Air transport operations developed enormously during 1944; they provided the Allied answer to the usual Japanese tactics of infiltration and envelopment and enabled the Allies to exploit their economic and technical

port in the Arakan. The decision was taken to effect the supply and ultimate relief of 7th Indian Division by air. Despite Japanese efforts to interrupt the process of delivery, which was decisively defeated by our Spit-



superiority to overcome the mobility and endurance of the Japanese soldier. The failure of the Japanese Arakan offensive in February provided the first demonstration of the tactical value of transport aircraft. A whole division was completely cut off by the Japanese, who aimed at nothing less than the capture of Chittagong, our major

fires, the division was enabled to resist and then to counterattack the enemy, who thereby suffered his first major defeat on land in this theater.

History repeated itself on a much larger scale during the following months, when a complete army corps together with substantial RAF elements was encircled on the

Imphal plain. From March to June this beleaguered garrison was maintained by air supply until it too was able to turn the tables upon an enemy who had rashly committed his forces to an operation which his supply lines, seriously worsened by the monsoon rains and harried continuously and effectively along their whole length by the Allied air forces, were inadequate to sustain.

Transport aircraft operating throughout the monsoon braved the worst possible weather over the mountains to fulfil missions whose urgency allowed no delay. Apart from the possibility of meeting Japanese fighters on their way—such encounters were, however, rare—they also had to face fire from ground troops when, as was frequently the case in the first six months of the year, they were required to deliver their freight in areas distant only a few hundred yards from enemy positions. In 1944 a grand total of nearly a quarter of a million short tons of supplies was conveyed to fighting units by crews who in some months were worked to exhaustion; in addition, over a hundred and sixty thousand men were moved from place to place and more than sixty thousand casualties were evacuated to hospitals outside the zone of battle. These figures underlie the operations which wrested victory from the Japanese offensives in Arakan and Manipur in the earlier part of the year and which made possible the Allied advance upon Myitkyina and the later thrusts which carried Allied forward troops to and beyond Bhamo, Wuntho, and the lower Chindwin.

Long-range attacks upon the enemy supply lines and kindred targets in Burma and Siam as elsewhere are cumulative in effect and their results can only be assessed after some passage of time. It has recently come to light that the Japanese supply deficiencies materially contributed to weaken resistance to the Allied advance into North Burma, and, to take another instance, that some Japanese reinforcements entering Burma from Siam have been reduced to doing so on foot or by cycle. Only occasionally is it possible to learn that, for example, some six hundred Japanese casualties were caused

by a single heavy bomber raid upon Bangkok, and only now and then do Allied aircraft have the opportunity of so spectacular an exploit as the two-day attack on 9 and 10 September by Beaufighters upon supply convoys moving up the Tenasserim coast. As a result of this attack, some three thousand tons of shipping were left beached and blazing and as much and more damaged.

Ground-attack fighters operated over enemy communications in Burma from January 1943 onwards, and by the beginning of 1944 had developed to a fine art the ability to detect their targets behind the elaborate camouflage in which the enemy was learning to shroud them. During the year, despite the increasing reluctance of the enemy to move in the open, our fighters made by day and night nearly 4,500 successful attacks upon river craft including over 140 steamers and powered launches, approximately 350 upon locomotives, and not far short of a thousand upon motor transport. Medium and light bombers also contributed to the interdiction of the Japanese lines of supply, their main targets being bridges; in all, some five hundred were destroyed or seriously damaged during 1944. It is an illuminating commentary upon the enemy reaction to these attacks that during the year he built no less than thirty-nine emergency bypass bridges of wood for use when the neighboring main structure should have been out of commission by Allied air attack.

During the latter part of 1944 the Strategic Air Force increased rapidly in size. Its heavy bombers, operating by both night and day, flew some 3,500 sorties during the year. These included twenty-two attacks upon targets in the metropolitan areas of Rangoon and Bangkok and other upon certain supply centers elsewhere, notably at Taungup and Prome in southern Burma. But a considerable proportion of the effort was directed against enemy lines of communications, particularly the railway linking Burma with Siam, on whose construction many thousands of Allied prisoners of war labored in 1942 and 1943. The twin termini at Moulmein, where the line is broken by the mouth

of the River Salween, were frequently included among the targets. The main north line of the Siamese State Railways, running from Bangkok to Chiangmai and serving the Japanese as a subsidiary line of supply, has also been attacked on numerous occasions as part of the same strategic plan.

Mining operations were carried out against the ports used by the Japanese to supplement their overland communications; these were mainly on the Tenasserim and Siamese coasts. One operation involved a round flight of over 3,000 miles—a record trip for Liberators in any theater of war. Very long distances over mountainous and poorly mapped country were also covered in attacks on targets in the neighborhood of Hanoi and elsewhere in French Indo-China.

The long-range offensive would not have been possible but for the work of the Photographic Reconnaissance Force, another mixed formation composed of RAF and U.S. AAF squadrons operating under Eastern Air Command.

The Allied achievement in the air over the Burma front, of which some indication has now been given, should be judged not by the standards applicable to the European theater of war but in relation to the tropical wilderness which has been its setting. The Burma front in length is comparable to the

Russian front, though owing to the impassable nature of the country, there are wide stretches of territory in which contact between opposing forces has been slight or nonexistent. The Allied bases in Bengal and Assam to the west have been sited and painfully developed in a countryside served by a single one-track railway which may have sufficed for the needs of the local peasantry but which in Europe would have been considered a poor source of supply for a battlefield one-sixtieth the length of the Burma front; waterways are more a hindrance than a help to communications, and such third-class roads as existed were normally quagmires for the four months of the monsoon, while nowhere did they reach completely to the battle line.

It is in such country, where until 1942 the only aircraft ever visible were the air liners calling at Calcutta on their way from Europe to Australia and the Far East, that airfields have been built, installations erected, and supplies provided for the squadrons, British and American, which are at present helping so powerfully in the reconquest of Burma. Their aid has been such that, it can fairly be claimed, in no other theater of war are the operations of ground and air forces so interrelated, nor the achievements of each Service accorded better recognition by the other.

The Value of Permanent Fortifications

Translated at the Command and General Staff School from an article in
Technische Mitteilungen für Sappeure, Pontoniere, und Mineure (Zurich, Switzerland) December 1944.

WHEN on 6 June 1944 the landing of Allied combat forces began on the French coast between the mouth of the Orne and the Cotentin peninsula, the question of the value of fortifications again moved into the foreground.

At the first blow struck, a wide breach was created in the Atlantic Wall. Since then, discussions have arisen here and there concerning the value or worthlessness of fortifications and "walls." As in 1940, when

France went down in a military sense in spite of the Maginot Line, those persons who declare that the construction of fortifications is senseless again have the upper hand in the arguments. Is this really so?

Indeed, on the face of it, it does appear a questionable undertaking when, at the cost of an enormous expenditure of labor, one spends years in the construction of a system of fortifications only to see them broken through in the course of a few days'

time, or so outmaneuvered within a few weeks, that they no longer play any role whatsoever.

Certainly, the person who bases his judgment on the premise that a fortification or a wall in itself is an absolute guarantee of safety, bases his opinions on fundamentally false assumptions. For never yet has a fortress or a fortified zone been absolutely indestructible, insurmountable, or impregnable. In the end, the attacker, when possessed of the necessary means and the necessary time, has thus far always been able to destroy fortifications or so damage them that they were no longer able, or fully able, to perform their functions. Repeatedly, too, the constant race between the passive power of resistance of protecting walls, either mobile (battleship or tank) or static, and the destructive power of the projectile has been won by the latter.

Whoever, therefore, is convinced of the impregnability of a wall because of solely material considerations has either failed to understand the purpose and capabilities of fortified works or has become a victim of propaganda despite his original stand, which may have been essentially correct. Up to 1940 the French Maginot Line propaganda was aimed at arousing in the French nation and the French Army the conviction that another enemy attack like that of 1914 could not and would not recur. Then, during the last few years before the war, the Maginot Line propaganda was joined by the German West Wall propaganda. It attempted to attain the same objective and was quite successful in this regard—so successful, in fact, that no serious attempt was made to assist Poland in her defensive fight in 1939.

After 1940, in place of the West Wall propaganda, there appeared that of the Atlantic Wall. For a long period of time, assurance of its impregnability was given expression by persons of the greatest prominence. Picture and film showed—and this was often overlooked—not a continuous wall but separate yet mighty fortifications. But the impression was created of a mighty, continuous wall. Very many persons in very many lands fell for this propaganda, and

from their number is recruited now the mass of those who refuse to ascribe any value whatsoever to fortifications.

To begin with, these men forget completely certain historical facts. Among other things, they no longer recall that the Maginot Line was overcome, essentially, by envelopment and was tactically breached at a few points only. It was breached, for instance, in the Kehl sector, but in this case the attack occurred at a moment when the defender, because of the despatch of strong forces to other points, was greatly weakened, and, in addition to this, defeatism had already created great havoc in his ranks. They have already forgotten how relatively great the power of resistance of the Maginot Line had been in the winter of 1939-1940, and that of the Metaxas Line [in Greece] in the spring of 1941. And when they call attention to the quick fall of the Mannerheim Line in May of 1944 as a proof of their theory of the worthlessness of fortifications, they overlook the fact that seemingly at this time (judging from reports from Finland) matters were not in such good shape as regards watchfulness and preparation for defense as they had been four and a half years before.

The same persons, also, fail to see the true purpose of fortification. This is a combat means, only one of many, and nothing more and nothing less. Furthermore, it is a combat means that is employed by the numerically weaker for the purpose of compensating, within certain limits, for this numerical inferiority. It is employed for the purpose of compelling the adversary to effect a time-wasting concentration of his forces, placing him in a position in which he can expect success only at the cost of committing great numbers of men and great quantities of matériel. They also overlook the fact that fortification, as a result of the protection which it affords, certainly reduces losses of men and matériel (a thing the foxhole also does in a more modest measure); that a certain numerical equalization is produced, though the protection we mention can never be anything more than relative, never absolute.

For instance, frontier fortifications, as they are known to many nations, are never constructed with the expectation of providing absolute protection and security for the areas back of them. Their purpose is mainly to guard against surprise attacks. They have fulfilled a very considerable part of their mission already when they compel an attacker to effect a concentration of his forces of such magnitude that it can be detected with sufficient promptness to render impossible a simple surprise attack across a frontier. And then, when the attack does come, border fortifications fulfil the other part of their mission which is to hold their own a few days longer than would have been possible without organization of the terrain. The fortification of certain sectors by nations which are basically aggressive also is a favorite practice much employed at those points where one desires to remain passive for the purpose of being able to get along with as few troops as possible in order to be as strong as possible at the points where a decision is sought in aggressive action. The Maginot Line was, of course, conceived as part of a fundamentally defensive type of warfare, and as little as it was able to protect France in the end, it nevertheless fulfilled its mission in a certain sense. It was definitely on account of the Maginot Line that the German drive was directed through Luxembourg, Belgium, and Holland in 1940. It forced Germany, also, to make enemies of these nations, a matter which was of no consequence at the beginning of the western campaign but which perhaps will be of much weight in the final reckoning that will follow the war.

The German West Wall existed simply for the purpose of providing as great security as possible in the rear for the period of the German expansion to the east, in Poland and the Ukrainian region. Its existence would deter the western powers from entering the war, or the German armed forces would be able to make out with weak forces in the west to the advantage of their operations on the eastern front during the Polish campaign.

Later on, in place of the West Wall, there

appeared the Atlantic Wall, which was designed for the purpose of playing the same role during the Russian campaign that had been played during the Polish campaign by the West Wall. And it played this role well. This fact is not altered in the least by its having been breached in June of 1944. Anyone judging the matter otherwise completely overlooks the gigantic and time-wasting preparations that were necessary on the part of the Allies before they were able to risk an attack. This wall gave Germany almost three years of freedom in the west. The fact that Russia could not be crushed during this time and that the eastern front, on the contrary, developed into an open wound for Germany that drained her of her blood and wore down her strength, her nerves, and her matériel has nothing to do with the Atlantic Wall. It is very likely that without it the west would have become active at a much earlier period than 6 June 1944, since the attack of the Anglo-Saxons would have started sooner. Hence, the Atlantic Wall rendered Germany great services from the operational point of view. Its existence greatly influenced the course of operations. That the German Wehrmacht on the eastern front was not able to fight through to operational freedom, execute a complete about face with the main body of her forces, and then take care of the situation in the west, constitutes no proof whatsoever of the worthlessness of the Atlantic Wall or of fortifications in general.

The particular reason for the failure of the Atlantic Wall when the attack finally occurred is a matter which cannot be conclusively answered till later. At present only a few suppositions can be expressed.

To begin with, attention must be called to the fact that false ideas have been very prevalent concerning the nature of the Atlantic Wall. From the northern tip of Jütland to the Spanish frontier is a good 2,500 kilometers. Even with hundreds of thousands of laborers and construction engineers and four years of time at one's disposal, no actual wall, that is, no continuous wall of this kind could be built with the depth and capacity

for defense in three dimensions required in the case of modern fortifications because of the possible envelopment from the air. So enormous a task simply could not be accomplished by the Todt Organization, which, it should be understood, also had other gigantic tasks to handle (the organization of the communications zones behind all the fronts, the North Sea Wall, the Mediterranean Wall, the East Wall).

We have already explained that fortification is a means employed by the numerically weaker for the purpose of partially compensating for his inferiority. This is possible, naturally, only within certain limits, for with fewer than a minimum of combatants and gun crews it is impossible for a defender to make out even with fortifications. Even if for the defense from Jütland to Biscay one hundred divisions were available, that is so little that there would certainly exist danger of breakthrough before troops had time to arrive from other sectors. This is especially true in case the attacker breaks through at some point where he is not expected and where, on this account, the garrison is small. That was possibly true for Normandy. Yet, in spite of this, the Atlantic Wall may have had its significance not only from the operational but also from the tactical point of view. It is well known that a number of the works held out for days after the fighting front had rolled on over them. Whether this *rolling* might not have been a *mad rush* if it had not been for the fortifications is still an open question.

We are therefore convinced that even today the construction of fortifications is fully justified. They are an aid, and as such are

able to render excellent services. The construction of fortifications, however, for which garrisons of sufficient strength or of sufficiently high quality are lacking is useless.

There is always one danger in the construction of fortifications, namely, that they may lull commanders and troops into a false sense of safety—safety for the individual who, perhaps, is led to the assumption that the fortifications free him from the necessity of complete commitment of his own person, that they offer him protection from injury and death; safety for the command who may be led to commit the mistake of estimating the defense power of their sector principally on the basis of the number of cubic meters of concrete and tons of iron and steel that have gone into their construction instead of on the basis of the living strength of the garrison. This danger is probably best eliminated by training the various types of crews who man the fortifications, and by no means last, those of the artillery emplacements, in the employment of mobile weapons outside the works. This is useful for the reason that in this way the idea of exterior defense, as well as that of continuation of defense after the destruction of firing ports, is automatically given the emphasis that it should have. It is also essential for preventing the bond between the heart and brain of the defenders and the concrete and steel of the works from leading to a state of immobility and fixedness, which, when it occurs, constitutes a deadly menace to successful defense. Where this fixedness exists, fortification becomes senseless and dangerous. If, however, because of this a wall is breached without excessive difficulty, it proves the lack of worth of the defenders but not of the fortifications.

Attack on a Fortified Zone in East Prussia

Translated and digested at the Command and General Staff School from a Russian article by Colonel V. Burtsev in *Krasnaia Zvezda* (Red Star) 14 March 1945.

IN our campaign in East Prussia, our division—I commanded one of the regiments—fought its way westward under a variety of conditions. Everywhere along the routes

of our advance the terrain favored the German defender. They always occupied heights, villages, streams, and private estates, converting them into formidable strongpoints. Many

such strongpoints were separated from each other by streams and canals, bordered by wide and swampy lowlands. Not infrequently the terrain in front of their positions was also swampy. All this impeded our movement and particularly the movement of our heavy matériel, such as artillery and tanks. Unfortunately, the defense of the enemy was based on stone buildings converted into permanent fortifications that could be destroyed only by means of artillery guns using direct fires at close ranges.

The Germans disposed their strongpoints so that all areas separating these strongpoints were well covered by fire. If a gap between two strongpoints stretched one kilometer or more, the enemy built additional defenses in between, erected permanent fortifications, and dug trenches. These well-camouflaged works and field fortifications were really dangerous if the attacker neglected to reconnoiter the approaches beforehand and limited his activities to so-called decisive directions. This will be discussed in greater detail.

All our officers knew that the Germans occupied and stubbornly defended not only their specially equipped fortifications but also houses, the basements of which were converted into sturdy weapon emplacements. When there were populated places in the attack zone of a regiment or a division, you could be sure that the enemy would be there ready to defend each and every building. This reasoning was quite correct, but because of this reasoning, our reconnaissance officers often concentrated their reconnaissance activities only on the decisive directions, neglecting the rest of the areas.

Our scouts worked, as a general rule, along main roads and attempted to determine the strength of the enemy occupying various populated places or previously discovered fortifications. The gaps between these fortifications and the areas between the roads—the so-called secondary directions—were often disregarded. The result was that the commander, when making his decision to attack, looked for favorable routes for bypassing the enemy and found it extremely difficult because his reconnaissance had not covered these areas.

Suppose we are standing before a German strongpoint. The terrain in front of it is swampy. To advance straight ahead, attacking the strongpoint frontally, is really foolish. And so the commander looks for a place, to the left or to the right of the strongpoint, which can be used to bypass the enemy. All gaps between the strongpoints, usually covered by shrubs and forests and traversed by canals and streams, attract the commander's attention simply because in advancing through such areas the attacker is much better concealed from the enemy. For this reason, when reconnoitering secondary directions, we should note how the enemy defends areas between his strongpoints, peculiarities of the terrain, and any additional fortifications within the zone designated for advance.

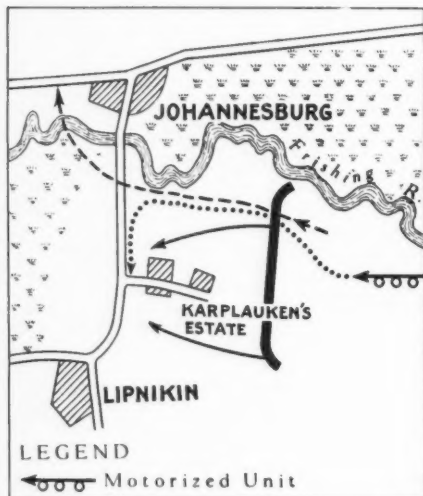
Not infrequently, the Germans deliberately leave such areas unoccupied, hoping to cover them by fire. Any commander trying to penetrate these areas without preliminary reconnaissance may find himself in an extremely difficult situation—a seemingly weak point of the enemy defense may cause excessive losses and unnecessary expenditure of effort.

When separate settlements are converted by the enemy into strongpoints and when these strongpoints cover the entire area in front of them, it is advisable to penetrate to the rear areas by infiltration. For this, small infantry groups armed with automatic weapons and carrying a sufficient supply of hand grenades are best.

Such penetrations of the German fortifications, even in small numbers (this is especially effective at night), force the enemy to leave his shelters and to detail special forces for the defense of these areas, thus uncovering the main direction. This means that the attack on the strongpoint will be facilitated, and it will be much easier to accomplish the mission.

This was fully proved in our campaign in East Prussia, in which my regiment participated. Advancing toward the city of Kreutzburg, we had to fight our way through several positions. These positions had concrete pillboxes and trenches and contained several buildings adapted for defense. In the

attack zone of our division, there was one German armored division deprived of its tanks and compelled to fight as infantry. In addition to this, the Germans had several Volksturm battalions. The retreating enemy defended every terrain line and tried to hold our advancing infantry wherever he had previously prepared positions. Fighting every



inch of the way and steadily moving forward, my regiment forced the crossing of the River Frishing and approached another German position. This position stretched through several settlements, private estates, and villages.

Our regiment, cooperating with the adjacent unit on our left, was to capture the sector of the enemy position based on the buildings of Karplauken's estate (see sketch). The Germans defended their position in numerous fortifications and in the stone basements of the buildings. The approaches to this strongpoint, the valley of the river, and the intervals between the adjacent strongpoints were defended by uninterrupted fire of artillery and mortars. Our regiment had eighteen artillery pieces. Together with the three artillery battalions of direct support artillery, our mortars kept the enemy defense

under a concentrated fire, paying particular attention to the fortified stone buildings of the estate. Tanks did not participate in this engagement. Our attempt to encircle the strongpoint from the north and south was unsuccessful: flanking fires of automatic weapons pinned our infantry to the ground. Utilizing the highway passing to the north of the river and another road running along the front, the Germans skilfully maneuvered their manpower and fire means, concentrating them in the direction threatened by our infantry.

It was necessary, therefore, to modify our plan of battle, which had been worked out while marching, and to try, first, to split the German position, and then to envelop each isolated part. This called for cutting the highway north of the river. In order to immobilize the enemy, it was necessary to reach the road to the west of the estate and to capture a few buildings, thus starting the encirclement of the German garrison.

It was getting dark when one of our infantry units set out to accomplish the first mission. The unit advanced unnoticed by the enemy, keeping not far from the river and concealing itself in the shrubs. It managed to cross the road running to the south from Johannesburg and to approach the bend of the river.

It should be noted that both banks of the river were very steep. These escarpments contained German rifle pits and emplacements for submachine gunners and machine guns. Our men compelled the Germans to leave the trenches and, employing chiefly hand grenades, forced them to withdraw to the north—to the highway. The river was covered with ice. Having passed the river, our unit again engaged the enemy in the vicinity of the highway. Again they used hand grenades and again the Germans had to withdraw. They occupied the other side of the road. The commander of the unit decided to stop the advance. He had accomplished his mission: the highway was cut.

The success of this unit helped solve the next mission, which was the occupation of several buildings of the estate. We decided

to fool the enemy by a bold and quick action. We obtained four large trucks and loaded on them four guns and a group of sub-machine gunners. The artillerymen were commanded by 1st Lieutenant Kopylov, and the submachine gunners were under 2d Lieutenant Konovalov. The entire group was commanded by the acting battalion commander, 1st Lieutenant Antonenko. At night, the group quickly occupied the road, then turned to the south and captured a small building west of the estate. The German soldiers and officers occupying the basement of the main building heard the firing in their rear and the noise of the motors, emerged from their shelters, and opened unorganized fire. By frontal attack, we routed the enemy in all the buildings. Having organized reconnaissance, the regiment continued its advance.

The extraordinary density of the East Prussian defensive fortifications called for

special tactics on our part. Disposed in checkerboard fashion, the German fortifications stretched almost continuously over the entire area covered by the advance of the Red Army. There was not a single stretch where our advancing troops battling their way from one breakthrough of the German position to another did not encounter formidable German fortifications or did not have to fight the Germans occupying separate strongpoints. The whole advance through East Prussia consisted of uninterrupted and stubborn engagements under conditions where the enemy fought back from solid and previously prepared fortifications. Having broken through one series of fortifications in one place, our troops again encountered new German positions equipped with trenches, pillboxes, and stone buildings, and it was only because of the uninterrupted assault action of our troops that we managed to overcome this formidable fortified zone.

The Renaissance of the French Air Force

Digested at the Command and General Staff School from an article
by L. Graham Davies in *The Aeroplane* (Great Britain) 16 February 1945.

FRENCH pilots and ground-crew men have been operating alongside their allies since 1940, when Great Britain fought alone. Today, however, the French Air Force is in full renaissance, and a formidable array of French squadrons operates on the Western Front under a combined Franco-U.S. command which functions with remarkable harmony. French combat units make up nearly one-half the strength of the First Tactical Air Force.

At the time of the North African landings in November 1942, there were two French fighter squadrons based in this country [Great Britain], one light bomber squadron in the Middle East, and one reconnaissance squadron in French Equatorial Africa. Apart from these complete units, many French pilots were already flying with the RAF and were held as reserves for the squadrons in question. By this time, there

was a regular monthly intake of Frenchmen into the RAF for training. All had escaped from France in one way or another.

With French North Africa cleared of the enemy, the ground-crew problem became easier, as quite a large number of regular Armée de l'Air men who had been stationed there joined up. The British Air Ministry increased the number of French fighter squadrons and added heavy bomber units, while French personnel was put under training for the formation of two Coastal Command squadrons. This steady build-up enabled the French to participate in the Allied invasion of Europe on D-day. The effort made by Great Britain to lay the foundations of a new French Air Force was a matter of extreme difficulty, for we ourselves were more than fully occupied in maintaining and increasing RAF first-line strength.

Meanwhile, the United States had entered

the war, the U.S. Air Force based in this country had grown to an enormous size, and our North American allies took a hand in assisting French air recovery. At the time of our North African landings, the few French fighter, bomber, and reconnaissance squadrons which had been allowed to continue their existence under Vichy, which was another name for German rule, had fallen into a moribund condition. The best French material dated from 1938 or 1939, and there was very little of it. The 1940 Armistice Commission had demilitarized almost everything French, but the morale of French airmen remained excellent, nevertheless. What they needed was up-to-date aircraft and equipment to help us chase the Germans and Italians out of all North Africa.

At the time of our landings, the French were assured that they would be rearmed as quickly as possible with an appropriate Air Force. In January 1943 a squadron of Curtiss P-40's was given to the French from U.S. equipment already available in the Mediterranean theater. That squadron, named the "Lafayette," after its famous prototype of 1914-18, has a most distinguished record in this war.

Later, the French received enough Bell P-39's to form three squadrons with all the varied equipment required to keep these aircraft flying. Submarines and German aircraft were, at that time, a constant source of danger to Allied convoys in the Mediterranean, and these French units did splendid work on coastal duties when the supply problem for Allied troops in North Africa was critical. In September 1943, the Allied air authorities drew up a combined plan for re-equipping and arming the French Armée de l'Air, taking into account material already ordered and delivered. The essential elements of a tactical air force existed in this plan, and the key factor governing its scope was the potential availability of French personnel to man the squadrons. The whole scheme was designed to make the French eventually self-sufficient and able both to operate and service their aircraft alone.

The rearmament plan approved by Gen-

eral Eisenhower in September 1943 called for squadrons of Spitfires, Bell P-39's, and Republic P-47's, together with photo-reconnaissance and long-range reconnaissance squadrons, medium-bomber units, in support of the French First Army. All the new squadrons were equipped with British or U.S. aircraft, and a comprehensive schedule of training for ground and flying personnel was drawn up. Training units were set up by the French in Morocco and Algeria, and many French trainees were sent to the United States and Great Britain, including flight engineers, radio men, armorers, bombardiers, and so forth, as well as pilots. In America, more than 3,000 Frenchmen were trained on airdromes and U.S. Air Force establishments in Florida, Alabama, Georgia, Colorado, Texas, Illinois, and Louisiana.

The U.S. Twelfth Air Force also set up French air training schools in North Africa to train pilots on Curtiss P-40, Lockheed P-38, Republic P-47, and Martin B-26 aircraft. All instructors at these flying training schools were combat pilots who had completed their operational tour, and thus had really up-to-date information to pass on to their French pupils. Later on, these training centers were turned over to the French, complete with all equipment and aircraft, U.S. instructors and maintenance crews remaining on loan to the Armée de l'Air until the schools were able to function alone.

Large deliveries of United States and British aircraft were made to the French Air Force during 1944, and Republic P-47 types as well as Spitfires were sent to the fighter squadrons, while bomber units received Martin B-26 Marauders. In addition, many Cessna C-78's, Vultee BT-13's, Douglas C-47's, Beechcraft C-45's, and Lockheed P-38's have been delivered. General de Gaulle's recent visit to England was particularly fruitful in obtaining equipment and clothing for the French Air Force.

In addition to the equipment and supply required by French combat squadrons and servicing units operating on the Western Front, the United States has also maintained in

North Africa, since 1943, a number of French Air Force depots and stations staffed by some 20,000 personnel of the Armée de l'Air. Until recently, there were about twenty French bases in the North African provinces maintained with U.S. assistance, amongst them being ten repair depots staffed for the most part by French Air Force personnel.

About 500 old French airplanes and over 1,500 French vehicles have been maintained in operation at the African establishments. When, after the most vital scene of western war shifted from the Mediterranean to Normandy and thence to Belgium and Alsace-Lorraine, the reborn French Armée de l'Air at last got to grips heartily with the enemy, it was incorporated with the U.S. First

Tactical Air Force, of which force French units form almost half, as already mentioned. French and U.S. personnel work together in a spirit of cordial comradeship and mutual respect.

Nearly all French Air Force squadrons are now based in their own country, and some are operating against the German Pockets still holding out on the Atlantic coast.

French squadrons in Alsace with the First TAF are using Marauders, Spitfires, and Thunderbolts. Recruiting for all categories is stated to be most satisfactory.

The rebirth of the French Air Force is proceeding with smoothness and astonishing speed, despite obstacles which might have appeared almost insuperable.

Modern Trends in the Development of Armed Forces

Translated and digested at the Command and General Staff School from a Spanish article by Lieutenant Colonel Gonzalo Fernandez de Cordoba y Parrella in *Ejército* (Spain) February 1945.

ALL battles consist simply in seeking out the enemy, inflicting blows on him, and attempting to avoid those delivered by him, both in attack and defense. With the advent of the first weapons, the problem still remained the same—the infliction and avoidance of blows. With the creation of the first armies, the problem did not vary in the least, and today in total and mechanized war the problem continues to be exactly the same, although harder to solve.

This problem has led to the organization, training, and equipment of special groupings of troops, charged, each of them, with some one of the operations which go to make up the battle. That is to say, the various branches of the service were created, each of which, at one time, had clear and well defined missions.

The cavalry has its definite mission (exploration, security, the charge, pursuit), the artillery has its own mission (breaching the enemy's lines or the walls of the beleaguered city), and the infantry has its own (attack with cold steel, assault). Later on, a fourth arm came into existence—the engineers, with a definite mission in mine warfare.

And back of these four arms were the services which made it possible for them to exist and fight and which continued to grow in complexity and number.

The separate weapons also possessed at that time clear and definite missions: the cold steel for the decisive act of the combat, the assault; the firearm for the protection of the advance.

But as time went by, with the advent of automatic weapons and artillery, the matter became complicated, and almost all types of armament possess now the double mission of attack and protection. Thus, the rifle and machine gun protect the infantry as it advances to attack. Division artillery protects the automatic weapons, being itself protected by the counterbattery fire of corps and army artillery.

That is to say, in the same way that missions and weapons gave rise to the various arms, the profusion and variety existing in the latter is, paradoxically, giving rise to a zone of fusion—or confusion—between the various branches of the service.

As a matter of fact, this variety and profusion of the branches of the service has led

to a gamut of attack fires of such variety that for each situation in an attack there is a special weapon that will produce the fire best suited for the occasion. The reverse is also true—the defender possesses at each moment a weapon suitable for replying to the one employed by the attacker. And in this interplay of attack and defense, of offensive and defensive weapons, such simultaneity of action is achieved that any weapon at any moment, through the mere fact of its being in operation in an offensive manner, provides protection for another of a different category. Thus the combined fires of the attacker are today, as in the past, a protection to the infantry, and the combined fires of the defender constitute an effort aimed at preventing the attacker from delivering his final blow.

There is no doubt that battles would be conducted with the maximum of efficiency if at all times and places and in every situation the various branches of the service had at their disposal the weapons best suited for the occasion. And this has led to specialization within the limits of the various branches and, in turn, to more and more profound and decisive changes in their organization.

As in all human activities, technical perfection is accompanied by increased complication in the matter of employment, and by a breakdown into specialties which at times acquire characteristics that give rise to doubt and even argument as to the arm or branch of the service to which they belong, and even within the limits of the same branch (tactically, what is a gun? what is a howitzer?) there is uncertainty in the matter of their classification. Naturally, these doubts and uncertainties produce a negative influence on organization, which is impaired by lack of clarity, with consequent loss of efficiency.

Let us note, for instance, the case of infantry and artillery. It is undeniable that within the confines of the ground forces, the infantry is the decisive arm and all others merely its auxiliaries. In the early history of these two arms, their respective operations were entirely independent of one another. The artillery opened the breach; the infantry

carried out the attack. But as the technique of firearms was perfected, the infantry felt more and more need of protection and, as a result of this, the artillery created new types of guns and organized itself in such a manner that it could prepare the attack first and accompany and support the infantry afterward. That is to say, the basic element of the battle has become the binomial—infantry-artillery.

The former independence has largely disappeared, and in its place there has developed so intimate, so intense a mutual penetration that there has been created an obscure zone in which they overlap one another. The famous phrase, "The artillery conquers; the infantry occupies," is a clear expression of this confusion and encroachment.

The creation of gun companies commanded by infantrymen and forming part of the infantry regiments of many countries is a clear demonstration of the fact that the overlapping between the two arms has resulted in a total and absolute fusion. There no longer exists any separation between the two arms.

Another case of uncertainty and confusion is offered by the infantry and engineers with their assault platoons. In some places these belong to the engineers, in others to the infantry, and in still others they are found in both. There does not appear, therefore, to exist any clear and well defined line of demarcation between these two arms which, to add the more to the haziness of the zone in which they overlap one another, frequently offer us the spectacle of infantrymen handling the pick and shovel and engineers fighting with fire arms.

To follow this matter to its lair, let us examine the case of the one branch of the service we have left—the cavalry.

Its romantic and heroic mission, the charge at the critical moment, has disappeared. It continues to have and will continue to have missions that are specifically its own—as is also the case with the other three arms—but it also possesses its nebulous zone where it overlaps in its activities with the infantry. There exist infantry units attached to large

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cavalry units; there exist large cavalry units that secure some sector of a stabilized front. Is this, then, not a mission that is proper to them? Yes—but it is a new demonstration of confusion.

These observations might, perhaps, give the impression that the ground forces are an entity of too great homogeneity to be spoken of with propriety as being composed of four independent arms.

As is apparent, up to the present we have referred almost exclusively to what might be termed the ground forces of 1918. But in the present conflict, mechanization has assumed an intensity that many never anticipated, and along with it many ideas and many methods have undergone changes, and the concept of war has undergone a complete transformation.

The principal element of mechanization in the ground forces is the armored vehicle which, though it may represent a gigantic step in military technique, represented at the same time an enormous increase in the complexity of the problems of organization—and they were already excessive.

To begin with, the armored vehicle means the motor, and this, applied as it is to the four arms, gives each of them exactly the same speed, and all of them greater speed than that of horse cavalry.

Nevertheless, classical type infantry divisions on foot are called normal. That is to say, they are the most numerous and they still have clearly defined and definite missions such as combat of the normal type, occupation of terrain, etc. And the same is true of the cavalry. However great the mean speed that may be attained by military forces as a whole, they will always require special, fast, light units for reconnaissance and pursuit that are able quickly to break off combat and engage in it immediately afterward at some other point or in another direction.

We have said before that the different branches of the service, or arms, were nothing more than the specialization of armed groups in one of the elemental phases of combat, and since the phase which gave rise to the cavalry still exists, the need for this arm also con-

tinues to exist without other change than that of the means employed for the attainment of the agility and speed which its mission requires. But a part of the classical missions of the infantry and cavalry of the 1918 type is now absorbed by the armored units, in consequence of which the zone of confusion has grown still darker with the appearance of this third element of discord.

And since artillery also now enjoys the distinction of wearing armor plate, and the tank, which is its sublimation, is armed with artillery pieces, the hazy dividing line between infantry and artillery has become more complicated than it was, giving origin to new and ambiguous expressions which far from clarify the situation, such as the term "assault artillery," in which the word "artillery," awakening ideas of immobility and power, forms a strange union with the word "assault" which is typical of and almost exclusively descriptive of infantry.

In consequence of all this, the following suggestive question arises in the mind of the organizer: "Armor in motion—ought it to form a new arm or should it be divided appropriately among the arms already in existence in accordance with their needs and missions?"

One additional arm—the air force—complicates the exercise of command, and its distribution among those already existing renders difficult to an unbelievable degree the employment and handling of every one of them.

Already in the United States a solution appears to have been found which, though not yet sanctioned by experience, will perhaps prove the correct one. It is the creation of the so-called "combat groups," a type of large unit formed of units of all sorts in the proportion required by the mission to be fulfilled.

Now the classic pincers has three jaws in place of two; two on the flanks and one overhead. No fortifications are able to keep the enemy back, and fortifications have lost, in consequence, a large part of their value. There is no material obstacle with which the air force can be opposed. But it has one great drawback—it is necessary for it to return to its starting point and, once on the ground, it

is defenseless. It then requires forces belonging to its own side for its defense and, in addition, the assistance of specialists and many and varied services; in other words, it requires a profuse and complicated organization for its operation.

Let us have a look, now, at the independent missions that aviation is able to fulfil in addition to its cooperation with the ground forces.

Among them, the principal ones are those of reconnaissance and bombing attacks in the enemy's rear. But up to what point are missions independent?

Aerial reconnaissance, a prolongation of that proper to the cavalry, is for the purpose of locating, classifying, and evaluating enemy troops or ground defenses. Hence, in the final analysis, the ground forces will be the beneficiaries. Bombing raids, aimed at the destruction of factories or communication routes, have as their object the hampering of the manufacture of war materials and their delivery to the troops. Hence again it is the ground forces who benefit by them.

Of missions of cooperation, there are two principal ones. The first is the transportation and disembarkation, either by means of parachutes or directly on the ground, of forces which, once on the ground, fight on foot and always in combination with other ground forces, for it has been proved that at the present time aviation is not able by itself to engage in and feed a battle, and Crete is the exception which confirms the rule, perhaps because there was no Allied aviation. The second mission is that of preparing, accompanying, and supporting the actions of the ground forces, which is exactly the same mission as that of the artillery with respect to the infantry. And since this mission must be fulfilled, the classical binomial, infantry-artillery, has now been replaced by that of ground-air.

If the operations are against a country situated on the other side of the ocean, naval forces will be the principal factor in the beginning, but always accompanied, supported, and protected by land or carrier-based planes, and this navy will fulfil three principal mis-

sions: transportation, fire support, and protection of the line of communications over which the battle will have to be fed. Thus, it will also operate in favor of the ground forces in the same way that, within the bounds of the letter, all arms will operate in favor of the infantry.

Hence, in the same way that up to the time of the first World War all combined operations were carried on by the different branches of the ground forces, in the modern battle and in the battle of the near future all combined operations will be carried on by the different forces, and in the combination, which may be dual or triple, the ground forces will always have a part.

We see now the influence of these considerations on the organization of a modern army. In the first place, unity of command is the basic principle of all organization. Hence, employing the proper logic, it seems natural that a single ministry—with whatever title seems most suitable (Ministry of War, for instance)—should embrace all the fighting forces of a nation, grouping them in three subsecretaryships, or secretaryships if it is desired to give them a higher rating.

This ministry should determine the proportions of men and material that each of the three forces is to have, within the limits of the general resources that have been made available by the government. It should also have charge of the training of the forces for war, giving minute attention to the instructional aspect, both that which is peculiar to each of them and that which is general and relates to cooperation between any two of them and among the three—a task exactly the same as that carried on today by the Ministry of the Army with the different arms.

But this principle of unity of command continues to hold, and just as up to the present time in the ground forces, army groups have been organized which combine, under a single command, large and small units in the proportion required by the mission and the terrain (there are already large artillery units), so in the future, those large army groups, with whatever designation appears most suitable for them, will be made up

of large ground, naval, and air units, each of them made up, in turn, of their distinct specialties or arms.

All this requires commanders who, coming from some one of the three forces, have been rendered capable of commanding the other two by means of suitable preparation, although logically, as a result of their origin, they are more capable in one of the three than in the other two. But it should be borne in mind that, judging from the experiences of the present war, there will be operations in which it will be necessary to know more about one of the three forces than about the other two, and there may even be cases where operations will start with one command, continue with another, and end with a third command. These changes will not be necessary at the time when there exist perfectly competent universal commands.

The problem of command brings up that of staffs, of which there must exist one general staff in addition to those belonging to each force.

Hence, we see that in the army of the future this matter of command and staff is simply an amplification of the present ground force where a general coming from any of the four arms has command of a large unit in which there are elements of all of them,

aided by other generals coming from the various other arms, the first seconded by a general staff for all the arms, and the second, by staffs proper to their respective arms.

We have perceived, as we have followed these lines, the undeniable parallelism that exists between the three forces of the present day and the three arms of yesterday, a parallelism that is so obvious and complete that one is inclined to wonder whether the term "army," denoting a grouping of all the combatants of each of the three elements, is not a little vague and lacking in significance. Likewise, the word "arm" is a little inadequate and outmoded in view of present conditions.

And as an ultimate and definite consequence of all these considerations, one is inclined to ask himself whether the term "army" as interpreted above should not express the totality of all the fighting forces of the nation, and the word "arms" refer exclusively to the ground, sea, and air forces, regardless of the number of specialties it may be necessary to divide them into, which, unfortunately and the more to distress the military organizer, will be more and more numerous and complicated as time goes on. In conclusion, it might be stated that something would also be gained if the services for this new army were unified.

RAF Photographic Reconnaissance Unit

Digested at the Command and General Staff School from an article by Charles Graves in *The Sphere* (Great Britain) 10 March 1945.

FOR years the Photographic Reconnaissance Unit of the RAF was so secret that even its initials (PRU) were deleted by the censor. Today the Photographic Reconnaissance Unit has been allowed to shed much of its cloak of mystery.

It often happens that aerial photographs taken by the PRU inadvertently produce valuable information. Almost any photograph taken behind the German lines can produce some lucky-dip result.

There are various forms of luck in connection with the reconnaissance photographs.

When one of our aircraft, following a tip, went to Peenemunde to take photographs on the off-chance of revealing information about V-weapons, it happened to take a photograph at the exact moment when one of the V-weapons was exposed to view for a few moments on the ground 20,000 feet below. If the photograph had been taken an hour later or earlier, it might not have disclosed the actual existence of England's future scourge. Equally, the German air-drome decoy fires were discovered accidentally by PRU. Other examples of good luck

have often been provided by aerial photographs taken of a specific "target." For in addition to the actual spot deliberately photographed, the camera's eye has disclosed valuable information within a few hundred yards. Thus a photograph taken of a stretch of roadway might cover an enemy airdrome housing the latest and unidentified German aircraft not yet used operationally. Our ex-

Out in Belgium, PRU is working for the Second TAF [Tactical Air Force] and, therefore, for the armies in the field, who are their main responsibility. It is their business to provide damage assessment, future targets, and advance information about enemy movements. They even work for the Admiralty, providing information about E-boats, midget submarines, block ships, and



INSTRUMENT WORKERS OF THE RAF TESTING VARIOUS TYPES AND SIZES OF CAMERAS BEFORE THEY ARE INSTALLED IN MOSQUITO AIRCRAFT ENGAGED IN RECONNAISSANCE FLIGHTS.

perts on the continent and in London know about many such types from early photographs.

All this is grist to the mill. For every photograph—to change the metaphor—is milked by photographic interpreters. The procedure is that as soon as the reconnaissance aircraft has landed at its base, RAF mechanics hurry to remove the camera magazines, which are in turn handed to a despatch rider. The latter roars off across the airdrome to the Mobile Field Photographic Section, where the films are immediately developed. If the matter is urgent, the photographic interpreters look through them while the negatives are still wet. If they see anything of vital importance, they mark them with a yellow pencil and have copies rushed to the suitable officers.

mine-laying activities. Many of their tasks are "laid on" through Second TAF and Army liaison officers. These tasks—of providing special photographs of special areas—frequently lead to other photographs being flown (PRU jargon for "taken"). The original photographs may have been flown to enable some tank commander to know which way to go, but they frequently provide vital information in addition to their original purpose, which needs further investigation.

PRU photographs go through three phases of examination. They are first examined stereoscopically by RAF photographic interpreters for their immediate operational value. The second phase is when they are examined for the daily report on rail movements and enemy airfields. Simultaneously the Army examines them for details of roads

and enemy defenses. The third phase occurs when they are handed over to research specialists, who may discover anything from the spoil left by an underground factory to a new type of jet plane.

Photographic interpretation is a fascinating study. Fortunately, the Germans were not track-conscious for the first three years of the war. They did not realize that English photographic lenses could be so perfect that they could show the footsteps of a single soldier who had walked over a meadow 20,000 feet below. The fact remains that the lenses are so good that they will show whether the blades of grass have been bent by the weight of a man. In this way, the Germans' affection for putting flak guns in hedges was revealed on innumerable occasions. Mind you, the photographic interpreter needs to know the country the facets of which he is interpreting. To the man who does not know France, a French conical haystack can look like an Army tent. For a long time the local method of storing potatoes in silos was mistaken for networks of trenches. In Norway, the method of drying hay over a rack was confused with barbed wire. The German habit of spreading manure in small piles on the top of a field, thus leaving white spots when dug in, originally fooled the photographic interpreters into thinking that mine fields had been laid.

Since D-day, over 17,000,000 prints have been developed as a result of photographic reconnaissance by the RAF. The photographs have been taken by day and by night; by an almost endless sequence of aircraft. PRU aircraft have in some cases no protection at all except speed. In spite of this, more than one pilot has been able to claim an enemy destroyed. On one occasion a PRU aircraft was jumped by two Messerschmitts. He jinked round the sky until both had apparently run out of ammunition, and one had run out of petrol. Anyway, the first Messerschmitt flew off home; the other flew alongside the English aircraft, the pilot of which made rude signals at the Hun twelve yards away. This so infuriated the Hun that he pulled away and made a final attack on

the English aircraft. The English pilot, his patience exhausted, swung around to meet the attack, knocked several feet off one of the Hun's wings, and had the satisfaction of seeing it dive straight into the ground. The English aircraft on this occasion was a Mosquito. On another occasion a Spitfire pilot was chased by a German jet plane. The Spitfire



INSTALLATION OF RAF CAMERAS.

rolled over at 21,000 feet and dived straight towards the deck. The jet plane followed impetuously, its pilot thinking that he could pull out of his dive just as well as the Spitfire. That is where he was wrong. The Spitfire returned happily to base after witnessing the jet plane's headlong crash into the ground.

Yes, in spite of their frequent lack of armament, pilots have little fear of armed enemy aircraft. They know that they can remain aloft longer and, in the case of jet planes, have much greater maneuverability.

PRU pilots often have to rely largely on their wits for survival. They have fewer aids to navigation. Unfortunately, too, there is no way of making a hole in the bottom of their aircraft so that they can be sure that they are really covering their target when taking photographs. What they have to do is to tip up the wing as they approach the area to be photographed, so as to make quite sure that they have lined up the target correctly.

In the early days, the cameras were placed in the wings at points where the cannon used to be. It was soon found, however, that there was not sufficient depth to house the thirty-six inch focal length of the cameras there, and so the cameras are now placed in the fuselage behind the head of the pilot. These cameras weigh, with their ancillary gear, over a hundredweight, and it is a tremendous tribute to the design of a Spitfire that it will fly so brilliantly when modified so drastically for its PRU role.

Spitfire pilots like to fly 30,000 feet, but if there is any risk of trail condensation, or if there is high priority on a small target, they may fly several thousand feet lower. But once they get under 18,000 feet they can expect a very short life, even if they duck in and out of the clouds.

One of the disadvantages of being a PRU pilot is that enemy aircraft may see from at least 400 yards away when an English aircraft is unarmed. On the other hand, if there is a lack of armament, this provides an extra twenty miles per hour, as well as an extra hour or so of flying time.

PRU cameras have two types of magazines, containing respectively 125 and 250 films, as well as five kinds of lenses suitable for photographing targets at different heights. There is, too, an oblique camera used for photography at nought feet, when it is vital to know if, for example, the medium bombers have really blown a bridge or have near-missed it. This "dicing" with death is only demanded of PRU pilots on rare occasions.

It will be noticed that all this photographic reconnaissance is done mechanically by cameras which are set in motion by the pilot or navigator when he reckons that he is over his chosen target. Visual reconnaissance is evidently impossible from 30,000 feet even by day. At night, Mosquitoes use photo-flashes (two feet long, four or five inches in diameter, and capable of exploding at pre-

determined heights). Spitfires only flying by day. Wellingtons, by contrast, only fly by night, but whereas the Mosquitoes fly 8,000 or more feet above ground, the Wellingtons are only a few hundred feet up. Their reconnaissance is largely visual. In other words, the air crews watch what they can see in their target area when they drop their twenty-five pound flares. One would have thought that the Wellington would be regarded as obsolescent, if not obsolete, by the RAF, in view of its now comparatively low flying feet. The fact remains that the Wellington crews like their aircraft. They regard them as sedate and gentlemanly, with much more endurance and toughness of construction than Mosquitoes and Spitfires.

Night reconnaissance by PRU aircraft is always tactical, seldom strategic as it is by day. A pilot will be briefed to fly along ten or fifteen miles of enemy roads, will reach his starting point and drop bundles of flares every two or three minutes to see what can be seen. Each bundle will illuminate a circular mile as clearly as daylight. One Wellington pilot told me that the best sight he ever saw was a convoy of over forty enemy lorries. On another occasion he saw a whole trainful of enemy tanks. Normally, the bomb-aimer—or, rather, the man who would be the bomb-aimer if the aircraft carried bombs—is the chief spotter. The pilot can only look out of his side window, while the tail-gunner's eyes are usually looking upwards to anticipate enemy aircraft reaction. Sometimes the Wellingtons fly only fifty feet above the ground.

PRU aircraft have done numbers of invaluable jobs since D-day. They have pinpointed the exact spots for airborne landings at places like Arnhem; they discovered the V-I sites; they found the *Bismarck* near Bergen and the *Scharnhorst* at LaPallice. They first reported the jet plane on the Western Front. They are continuously having "press-on" days when vital information has to be secured.

Victory in the Pacific

Digested at the Command and General Staff School from an article
by Francis McMurtrie, AINA, in *The Navy* (Great Britain)
March 1945.

If there is one lesson that the war with Japan has driven in up to the hilt it is the importance of the aircraft carrier in modern naval warfare. Without such vessels it would have been hopeless to expect rapid progress over the widest ocean in the world, interrupted only occasionally by islands.

This has again been illustrated by the ease with which a task force comprising a large number of aircraft carriers under Vice Admiral Mitscher has diverted the attention of the Japanese land-based air forces while the main body of the Fifth Fleet under Admiral Spruance has been storming the island of Iwo, soon to become an Allied base from which further attacks can be launched.

That the Japanese themselves were the first to appreciate the above fact there is little doubt. Quick to learn from the experience of others, they had carefully noted the successes gained by the Royal Navy at Taranto and at Matapan through the skilful employment of carrierborne aircraft, notwithstanding the disabilities imposed by the enemy's possession of plentiful airfields on both sides of the narrow Mediterranean. In the Atlantic the contribution of the Fleet Air Arm to the destruction of the *Bismarck* has been equally remarkable.

Thus when the bolt from the blue fell at Pearl Harbor on Sunday, 7 December 1941, aircraft carriers were the spearhead of the attacking force. It is now known that these included the new 29,000-ton *Syokaku* and *Zuikaku*; the slightly smaller and much older *Akagi* and *Kaga*; and the lighter but more modern *Hiryu* and *Soryu*, of 10,050 tons. Together, these six ships would be able to accommodate about 400 planes, a proportion of which would naturally be fighters. Thus the original estimate of "between 150 and 300 raiders" may not have been so exaggerated as was at one time thought.

It was the enemy's hope that the three aircraft carriers which at that time formed

part of the U.S. Pacific Fleet would have been lying in their berths at Pearl Harbor on that fatal Sunday. Actually, one at least of them, the USS *Enterprise*, was with a detached force which had left Pearl Harbor on 28 November to deliver a number of new fighter planes to Wake Island. The program of this force envisaged returning to base before dark on 6 December, a fact that was possibly within Japanese cognizance.

Instead, a gale which caused a destroyer's seams to open delayed the force's return by twenty-four hours; and in the meantime the remaining part of the carrier division had been dispatched in some other direction. Thus not a single American carrier remained in port to become a target for torpedo or bomb attack at daybreak on 7 December.

Still, the blow was heavy enough in all conscience. The United States Navy sustained a major defeat at trifling cost to the enemy. Its battleship strength for the time being was reduced to bare equality with that of Japan. Almost simultaneously the only two British capital ships that could be spared for service in the Far East fell victims to a concentrated air attack in the absence of Allied carrierborne fighters.

Had the enemy been prepared immediately to follow up their success with a combined operation against Hawaii, the duration of the war might have been extended very considerably. Fortunately for the Allies, Japanese strategy was governed by the Army, nurtured on German ideas; and the attractions of East Indies oil combined with a frantic urge to close the Burma Road to China to prevent the Pearl Harbor stroke being followed by the landing of enemy troops in Hawaii.

It is also possible that the Japanese naval authorities were reluctant to risk their few but precious aircraft carriers in view of their failure to destroy those of their opponents. At this stage in the conflict they possessed,

besides the six already mentioned, a couple of others too small to be of value except for training purposes, together with five medium-sized carriers just converted from depot ships or seaplane tenders. Moreover, under construction or conversion were half a dozen larger fleet carriers. For the moment, therefore, there was little to choose between the United States and Japan in carrier strength.

Everything would thus seem to have depended on getting the lead in this important category of warship as quickly as possible, and keeping it. In such circumstances the bolder course would almost certainly have been the safer one.

Indeed the desperate plight in which the Japanese Fleet finds itself today may be largely attributed to its penurious policy of using only limited forces with local objectives. In practice, this meant that at best losses were inflicted and sustained on a fifty-fifty basis. When the southward advance of the enemy towards Australia was checked at the Battle of the Coral Sea in May 1942, the Japanese lost the medium-sized carrier *Shoho*, and at least one cruiser, but succeeded in sinking one of the two largest U.S. carriers, the *Lexington*.

Too late, an expedition against Hawaii was at last prepared. It sailed with orders to take Midway Island en route. The U.S. Pacific Fleet stood in the way. Both sides flew off air striking forces, the torpedoes and bombs of which destroyed the Japanese carriers *Akagi*, *Kaga*, *Hiryu*, and *Soryu*, while the Americans lost only one, the *Yorktown*, of 19,900 tons. Hawaii was thenceforth free from fear of invasion; and the reduction in Japanese carrier strength entitles this battle to rank as the turning point in the Pacific War.

For the next eighteen months, operations were mainly conducted in the New Guinea—Solomons area, where the Japanese clung tenaciously to the islands in which they had established themselves. In actions known as the Battles of Savo Island, the Eastern Solomons, Cape Esperance, Santa Cruz, Guadalcanal, Tassafaronga, and Kula Gulf, Japanese losses included the battleships *Hiei* and

Kirishima, the small carrier *Ryuzo*, and an uncertain number of cruisers; while the United States Navy lost the carriers *Hornet*, of 19,900 tons, and *Wasp*, of 14,700 tons, with eight cruisers. Slowly but surely the enemy was driven from one island after the other, and farther westward along the New Guinea coast.

With growing strength, especially in aircraft carriers, the U.S. Navy was enabled to strike at new and more distant objectives. Japanese strongholds in the Gilbert and Marshall groups were overwhelmed after heavy fighting. Truk was bombed and bypassed. Saipan, chief Japanese base in the Marianas, was taken after a stiff struggle, and Guam, former American possession in the same group, was reconquered.

A threat to the Palau Islands, nearest of the Micronesian groups to the Philippines, at last brought the Japanese Fleet into the picture. Detected by air reconnaissance off the east coast of Luzon, it was heavily attacked by U.S. carrierborne aircraft and suffered the loss of the 29,000-ton *Syokaku* and another big carrier converted from an express passenger liner, probably either the *Hiyo* or the *Junyo*. This action is known as the Battle of the Eastern Philippines.

Four months later the American invasion of Leyte, first step towards reconquest of the Philippines, again stung the Japanese Navy into activity. In order to be within easy reach of oil supplies and so relieve the strain on the stocks in Japan, the larger part of the enemy fleet had been stationed in the waters of Borneo and Indo-China. To effect a concentration, three separate squadrons converged on the Philippines area. Long before a junction could be effected, the squadron coming from Japan itself was attacked to the northward of Luzon by aircraft of the U.S. Third Fleet under Admiral Halsey.

In this onslaught, the *Zuikaku*, of 29,000 tons, together with three smaller carriers, the *Titose*, *Tiyoda*, and *Zuiho*, all conversions, were destroyed. Three of these were torpedoed or bombed to destruction, but the *Zuiho* was sunk by gunfire of American cruisers and

destroyers after being disabled by the air offensive.

Meanwhile the two enemy squadrons from the southwestward had also been under heavy air attack. One, including the old battleships *Huso* and *Yamasiro*, was practically annihilated, but the other, which included the two big new battleships *Musasi* and *Yamato*, pushed its way through to the eastward of Leyte and succeeded in sinking three American carriers, attached to the Seventh Fleet under Vice Admiral Kinkaid, the *Princeton*, *Gambier Bay*, and *St. Lo*, all vessels of moderate size.

With the return of the Third Fleet and its aircraft, this force was in turn driven off, and during its retreat suffered the loss of the *Musasi* and other ships. For the Japanese Navy to recover from such a decisive defeat is clearly impossible.

In all these operations, with the exception of certain of the night actions in the Solomons, the novel feature has been the leading part taken by aircraft carriers. Superiority in ships of this category has been a vital element in Allied victory over Japan. Thus the air arm has given a fresh weapon of enormously greater range to fleets which formerly depended on the guns and torpedoes of their ships to bring about a decision.

It does not follow from this that the day of the battleship is done. Often threatened, the battleship has never yet been eclipsed and still retains its position as the strongest and heaviest-hitting type. That the trend of design may be influenced by the events of this war is inevitable, but modification rather than elimination is to be looked for as the line to be followed.

Smoke Screens in Tank Operations

Translated and digested at the Command and General Staff School from a Russian article by Lieutenant Colonel G. Khanatskii in *Krasnaia Zvezda* (Red Star) 4 January 1945.

SMOKE screens for concealing the movements of tanks on the battlefield are used very widely. They help execute tank maneuvers unnoticed by the enemy and reduce losses caused by enemy antitank weapons. The use of smoke for this purpose, however, is not so easy as it may seem.

More often than not, the need for a smoke screen arises quite suddenly and unexpectedly after the tanks have been fired upon. To be of any use, the smoke screen should be laid down in a matter of minutes. The sooner the tanks are protected by smoke, the smaller will be their losses. To wait for special chemical warfare units under the circumstances is senseless, and besides, they cannot always operate ahead of the tanks. Consequently, when the tanks are in the immediate vicinity of the enemy, the laying of a smoke screen can be done only by a fast and fairly invulnerable vehicle, or a tank.

It is, of course, desirable to have for this purpose a specially equipped tank. We know,

however, that a smoke screen can be laid by ordinary tanks supplied with a sufficient amount of smoke-generating chemical. The mobile character and the short duration of tank engagements do not hamper but actually facilitate the use of smoke screens, for smoke screens in fast-moving engagements need not last a long time. All that may be required to secure a tank maneuver, for example, is a screen lasting ten or fifteen minutes, which is generally sufficient for completing the maneuver or leaving the area under enemy artillery fire and concentrating elsewhere for a new attack.

The experience in using smoke screens in tank engagements has shown that the difficulties and the risk taken by the smoke-laying tanks are fully justified by the advantages derived from free maneuver under the protection of the smoke. One of our tank companies, for example, was ordered to reconnoiter the enemy's dispositions near a railroad station. The country around the station was open and

fiat. Therefore, when the company was taken under enemy artillery fire on its way to the station, the situation suddenly became difficult. There was an ambush in the orchard of a nearby farm located on a hill, and the enemy could easily hit our machines from that position. There was no cover anywhere around, and to bypass the height was now too late, because from their advantageous position the Germans could keep our tanks under fire for a long time. For this reason the commander decided to protect the battle formation of his company by a smoke screen. He lit and threw off his tank a smoke-generating stick and ordered the rest of the tanks to follow his example.

In half a minute the rising smoke had all the tanks concealed from enemy observation. The Germans stopped firing. The wind gradually blew the smoke cloud toward the enemy. Keeping behind the smoke, the commander led the company parallel to the movement of the smoke screen. And as they progressed, additional smoke sticks to maintain the smoke screen were thrown on the ground. Soon the tanks were on the flank of the enemy ambush and about 800 meters from the farm. Two tanks were left in the bushes, while the rest of the machines moved around the smoke screen at full speed in order to attack the ambush from the flank and rear. The tanks in the bushes opened fire from their stationary positions, for the smoke was beginning to thin out. The enemy noticed them and concentrated all his guns on these two tanks. An unexpected attack by the remaining tanks suddenly emerging from the smoke caught the Germans unawares. They did not have enough time to turn their guns. The enemy ambush was destroyed and our tanks went on.

In using smoke screens, tanks seldom enter the smoke but strive to keep it between themselves and the enemy as a sort of concealing obstacle. The reason for this is that smoke considerably limits the observation from tanks, and a moving tank can easily fall into a hole in the ground. Lowered visibility is likely to result in some loss of control. That is why the commander of the tank company in the foregoing example led his company

not through the smoke but around it and parallel to its movement. Although his maneuver took more time, it definitely helped to reduce losses and in the end enabled the commander to accomplish his mission successfully.

Under no circumstances should the enemy be allowed to utilize our smoke screen for regrouping his antitank guns. When screened by the smoke, our tanks cannot observe the enemy, and if the smoke screen is not large, the purpose of the maneuver is easily determined by the enemy. Knowing this, he will, of course, try to displace his weapons to meet the new situation and prepare for firing in the new direction. How can we prevent such a countermovement?

First of all, do not let the enemy get out of your observation. To prevent this, tanks with observers are ordinarily sent out to the flanks of the smoke screen. Firing from concealed positions, these tanks try to prevent the enemy from displacing to new positions. In addition, they divert the enemy's attention to themselves.

In the engagement described above, the commander had his two tanks in the bushes for this very purpose. Their fire facilitated the maneuver of the company and prevented the enemy from preparing to repulse our flank counterattack.

Whenever a smoke screen is laid before the beginning of the advance—and not in the course of a maneuver—care should be taken not to blind our own men. In such cases it is better to fire smoke shells on the enemy antitank artillery and observation posts. The advantages of this method are obvious: our tanks do not have to go through or drive around the smoke screen. And besides, blinding smoke marks very well the location of the targets to be first taken under fire of our tanks.

Unfortunately, the use of smoke shells by the artillery or mortars at the request of tank commanders is not always possible, for during the artillery preparation the smoke rising from the enemy's main line of resistance interferes with aimed fires. Later, however, when our tanks penetrate the position,

the artillery is already occupied with fire missions in the depth of the enemy position. Under such circumstances, the tankmen are compelled to use their own means of smoke laying. In doing so, however, care should be taken not to blind the tank drivers.

When the impending maneuver is frontal and the wind blows along the front or toward us at a slight angle to the front, smoke generators should be placed as close to the enemy as possible. This type of smoke screen conceals our tanks only during the approach to the main line of resistance. Such smoke screens are laid by special smoke-laying tanks. To do so, they quickly break through at high speed toward the line designated for the smoke screen.

Here is an illustrative example. The Nth Tank Regiment, operating with an infantry unit, was to attack a well-organized position. The terrain was not difficult for our tanks, but the way to the position was obstructed by an antitank ditch. Paths over the ditch were to be made by our sappers during the attack, for the ditch was well covered by artillery and machine-gun fires. There was not sufficient time for thorough preparations. To make the sappers' mission easier, the commander decided to use smoke. Several tanks carrying submachine gunners well trained in smoke laying were detailed for the job. Five minutes before the beginning of the artillery preparation, this group was to approach the

ditch and lay a smoke screen utilizing the wind blowing along the front. The smoke screen was intended to last only a short time.

The tanks moved ahead at top speed with intervals of from 250 to 300 meters. Three of the machines succeeded in reaching the ditch. The fourth tank hit a mine near the ditch and had one of its tracks damaged. Nevertheless, all the tanks participated in smoke laying. Smoke-generating devices were quickly thrown into the ditch, and the resulting smoke quickly covered the tanks and the men riding on them. Because of this protection, the enemy was unable to prevent further action of the smoke-laying tanks. The submachine gunners distributed smoke pots all along the ditch, and the smoke curtain was thickened by another smoke wave. Under the protection of this smoke, the tank breakthrough echelon approached the ditch. The sappers came with this echelon. Paths through the ditch were soon prepared, and the tanks began crossing over. When the last tank had crossed the ditch, the smoke was sufficiently dispersed and did not interfere with the action of our tanks against the main line of resistance. The attack was crowned by a successful breakthrough, and we had practically no losses in tanks.

Let us note, by the way, that a drifting smoke screen is likely to blind adjacent units operating on the lee side. To avoid this, it is necessary to coordinate with your neighbors the time and sequence of your smoke screens.

Turning the Siegfried Line

Digested at the Command and General Staff School from an article in *The Times* (London) 13 March 1945.

WHEN the last German positions within the bend of the Rhine west of Wesel were cleared, British and Canadian forces under General Crerar, commanding the First Canadian Army, stood in strength along the left bank of the great German river all the way downstream from Wesel to Nijmegen (see sketch). But they had had to fight for virtually every mile of the way they had come since the morning of 8 February when they

swept eastward through the little frontier town of Beek, and Groesbeek, in Holland, a few miles to the south.

The purpose of this operation was to turn the right flank of the Siegfried Line and secure the region between the Maas and the Rhine southeastward to a line running roughly through Geldern to the river bank opposite Wesel; and to destroy as much as possible of the German military strength in

doing so. General Crerar's Canadian command was first strongly reinforced by British divisions, including Scottish, West Country English, and Welsh infantry, with one formation of mixed British infantry battalions, and armored formations composed of units of the Guards, the Royal Tank Regiment, and British cavalry and yeomanry. One way and another the British representation heavily outweighed the Canadian element, which, even so, included more than a division of armor and two infantry divisions, besides troops of all other arms and services. It was thus a very fine mixed force, in great heart, which went over the start lines as an augmented corps under the command of the British Lieutenant General Horrocks, after a preliminary bombardment by one of the most powerful concentrations of guns—heavy and superheavy as well as field and medium pieces—so far used in this war. There were in fact about 1,400 guns. The German towns of Cleve and Goch, vital communication centers near the northeastern and southeastern edges respectively of the Reichswald, the great defended state forest which was the immediate objective of our assault, had been practically obliterated overnight by RAF Bomber Command.

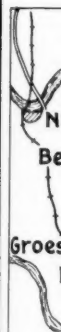
The Canadian infantry took the extreme left flank and struck due eastward towards the Rhine at Millingen; the British divided and went eastward for Kranenburg and southeastward to Bruk and the western tip of the Reichswald. There was little more than the 180th Infantry Division of scarcely first-class troops, with elements of the very good 2d Parachute Division, in front of them at the time, and those Germans in the Reichswald, where a grim task had been anticipated, were largely surprised and "bounced" out of their positions before they could do much. But that was only during the first day or two, and around the northern part of the forest. Thereafter, foul weather, coupled with the already flooded state of the Rhine and an extension, through German demolitions, of the floods north of Nijmegen, made progress on the left flank unimaginably difficult.

The road to Kranenburg and Cleve, the one available highway for all purposes, was soon awash, so the engineers and pioneers made the parallel railway track serve for road vehicles, till that too became flooded. Then the main burden of transport had to be taken over by fleets of amphibious vehicles with such zoological names as "buffaloes" and "ducks" and the little "weasel" swimming carriers. Northward to the Rhine the land was like a lake, and on this the Canadians put out in amphibians and a variety of water craft to keep themselves moving on the left flank towards the Cleve-Emmerich road.

British infantry on the axis of the Groesbeek-Cleve road made excellent initial progress. Passing through Kranenburg they carried the Nutterden feature and on the fourth day they captured Cleve. The boating Canadians then having reached Griethausen on the railway running northward out of Cleve, the left flank of our advance began to wheel around to the southeast. In the meantime the enemy had pulled himself together after the shock of the massive preparatory bombardment and the surprise of our first assault. Of his overrun 180th Infantry Division, the bulk of the effectives were by then our prisoners or had been otherwise "written off"; but the inevitable slowing down of movement by the floods and the masses of mines he had placed in our path had given the enemy time to reinforce around the eastern and southern edges of the Reichswald.

The 190th Infantry Division had pushed some of its elements up from the front farther south, and whole divisions of the First Parachute Army were in the field. There was soon no doubt about the fighting quality of the parachute troops, who are probably the best still remaining in the German Army, and they were quickly backed up by the Panzer Lehr Division, the 116th Panzer Division, and the 15th Panzer Grenadiers. Nine divisions, mostly of good troops, with an increasing weight of artillery which in a few days amounted to about 400 guns, were all too quickly ranged against General Crerar's men, when, but for the accidents of bad weather

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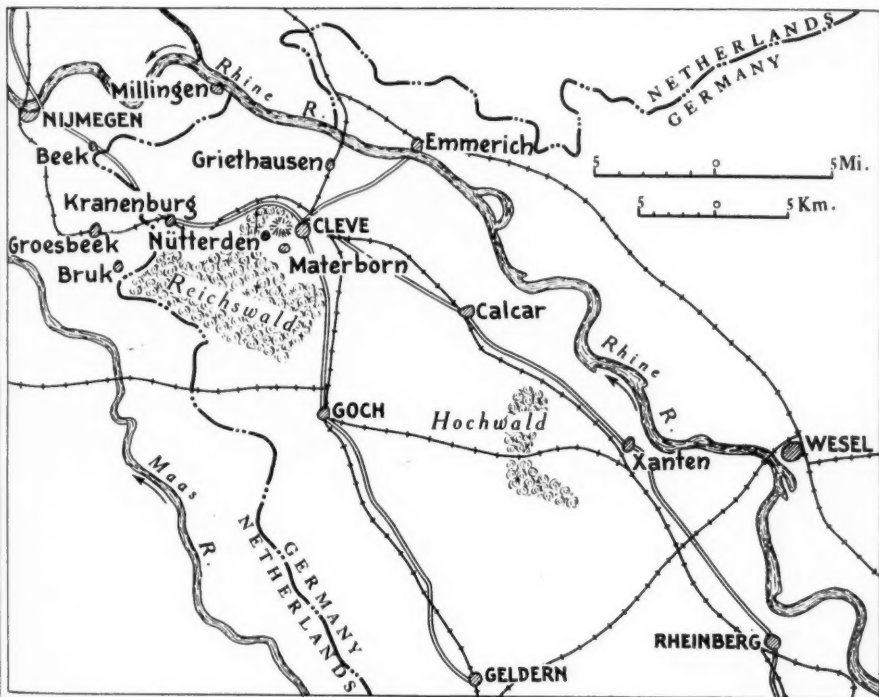
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and flooded ground, they might have made and exploited with armor a breakthrough to Xanten.

There was no breakthrough, then or later. The first surprise assault had carried us through the outer defenses of the northern end of the Siegfried Line around the Reichs-

strong positions in the Hochwald as a hinge, he gradually swung his center and left back anti-clockwise to form a bridgehead covering the Xanten, Wesel, and Rheinberg crossings of the Rhine.

All this was done, as our commanders admit, with well-nigh perfect control on the



wald, but thereafter the thing became for both sides mainly an outright battle of infantry and artillery. Tanks, in which we were vastly superior, had few chances. Our aircraft, too, in the mainly unfavorable weather were rarely able to give the full weight of their support to the troops. It was a matter of pushing relentlessly forward, often at no light cost. The enemy employed every conceivable trick of weapons and the use of ground in carrying out a fighting withdrawal by which, holding his immensely

German part. At no time could we "rush him off his feet." After our capture of Materborn and Cleve his resistance along the southern part of the Reichswald stiffened and persisted until finally broken by a noteworthy old-fashioned assault with the bayonet by Scottish, Welsh, and English infantry. Southeast of Cleve he made a series of counterattacks and attempts to cut our supply lines which, though they cost him dearly in tanks and men, did much to check our advance to Goch and Calcar.

At different times all the British formations became engaged in bloody battles and suffered grievous losses; but to the Canadians fell the grim tasks of clearing the Hochwald, the "Jay-back" of the Siegfried defenses and the strongly protected hinge area for the enemy's withdrawal, and later of clearing the southern approaches to Xanten. Those were indeed terrible struggles, to be commemorated in the annals of Canadian heroism with those of Caen and Falaise and around the Schelde estuary.

But when all is said and done, it is to the engineers, British and Canadian alike, not forgetting the British pioneers who worked alongside them, that the major tribute must be paid. Without their unflinching determination and improvising skill the delayed advance could never have gone even at the rate it did. Bridging, by day and night, often under fire; the maintenance and repair of over-used roads (including sometimes adapting railway tracks for road traffic); the spanning or filling of craters and antitank ditches; finding and lifting countless mines—these were among the tasks done by a wonderful body of

soldiers who at times labored amid all the risks of battle without the stimulus of taking part in it with arms. The men of the armored formation who worked the troop- and supply-carrying "buffaloes," and the mine-exploding "flail" tanks and flame-throwing "crocodiles," had their full share in the success of the operation; and none forgets the achievements of the RASC [Royal Army Service Corps] navigating their "ducks" with supplies over the waters, or the constant presence up at the front of the devoted RAMC [Royal Army Medical Corps] with their ambulances and dressing stations and field operating theaters, or the unrelenting ubiquitous linemen of the Royal Signals.

All arms and services have worked superbly as a team for the purposes of a campaign which, among other things, has resulted in the capture of about 22,000 of the best German troops, with the destruction as effective of at least as many more; the turning of the Siegfried Line, and a strong junction with the United States Ninth Army along the left bank of the Rhine.

Jungle Fighting in Burma

An article by Lieutenant General Sir William Slim, Commander Fourteenth Army, in *Aim*, army magazine of the British Middle East Command, No. 38, March 1945.

FEW of us, whether from the cities and open country of Britain and the Dominions, from the plains of India, or from the hills of Nepal, are used to the jungle. At first it bewilders, depresses, and even frightens us. In the Fourteenth Army we have found two remedies for this—training and experience—and of these, training comes first, because unless experience is based on live training it is apt to be costly.

The strangeness, the silence broken by a sudden unexplained noise, the limited visibility, the appalling laboriousness of movement, the knowledge that here there is no "front," and, above all, the isolation that you feel only a few yards from your comrades will all affect you in the jungle at first. But training will tell you what the noise means,

make up by quickness and observation what your vision lacks in range, teach you to move steadily and quietly, and how to keep touch. A little experience, and you will realize—a most cheering thought—that your beastly little yellow enemy is more jittery than you are.

The Jap is an insect. Picture yourself fighting man-size red ants and you've got it. He has all the qualities and faults of the fighting ant. He is tough, mobile, industrious, disciplined, callous, and vicious. He goes on till you stamp on him and kill him. But, like the ant, he is not very well equipped to be a world-beater. He is stupid. He does the same things in the same way and goes on doing them; he acts by instinct rather than reason; the unexpected confuses him terribly. He is

not difficult to kill if you go the right way about it.

To deal with the jungle and the Jap, the basic needs are first-class infantry and air supply. We need also, of course, guns, tanks, signals, air support, and the rest, but infantry and air supply are the foundation of success in country where fighting is close but distances great, and railways and roads do not exist.

Don't go in for elaborate brigade and divisional exercises until the individual and section training is right. We have to produce a tough, self-reliant hunter, who is out to get up to his enemy and kill him. Physical fitness comes first, not the old games-playing fitness, but endurance, the power of prolonged steady exertion, day after day, and all on your own feet. Next, discipline—no unit that has not got the highest standard of discipline will keep going in the jungle. For one thing, it will not obey antimalaria orders, and that will be the end of it. Then weapon training—the quick shot at close range. The Jap is a rotten shot; you'll get him every time if you are quick on the draw. Fire discipline cannot be too much insisted on in training. The Jap will do all he can to make you waste ammunition so that you give away your position and he can attack you when you have empty weapons. Don't shoot at noises. Shoot only when you can see to kill. Train in observation. Better a third-class shot who keeps his eyes and ears open than a marksman who doesn't. Survival depends on observation; learn really to see what you look at. Spend time teaching your administrative personnel, medical, supply, transport, welfare, to be basic infantry even at the expense of their technical training. There are no noncombatants in the jungle.

In jungle fighting more than in any other form of war, success depends on the junior leader. He must be trained to be tougher than even his men; everything they can do he must do better and do longer. He must use first his eyes and ears and then his brains to outwit and fox the Jap. He must, during training, accustom himself to the idea that the enemy will be behind him frequently, and that there is no need to panic about such a normal thing. He will train himself and his men to be past-masters in patrolling because in the jungle patrolling must be constant, and superiority in this gives that aggressive confidence which is the very soul of an army.

It is comparatively easy to know what you want to do in any kind of war. Leadership consists in knowing whether you *can* do it—the risks you ought to take. In the jungle the chief risks for the higher commander, the brigadier and upwards, are administrative. He must learn to be a judge of administrative risk. He must be air-minded in the sense that he regards—and makes others regard—air transportation, air supply, and air close support as an integral part of normal operations. He must teach his formations to be as ready to put themselves into airplanes and gliders as they are to get into trains and lorries. In all training he should remember that to advance on a narrow front and attack the Jap frontally is to invite a bloody nose. He should use instead the broadest front possible and constant "hooking" to get behind. Keep pressing. The initiative is all-important in jungle fighting. Lastly, during training all commanders should experiment in new tactics, new methods of administration and transportation. Don't get into a rut, even in the jungle.

Artillery Support of Infantry Attack

Translated at the Command and General Staff School from a Russian article by Colonel E. Idelson in *Krasnaya Zvezda* (Red Star) 20 February 1945.

THE importance of precise and uninterrupted cooperation between the infantry and the artillery cannot be overemphasized. It

must be thoughtfully and carefully organized during all phases of the battle and based on a thorough knowledge and understanding of

the sequence of events during the artillery preparation.

While it is going on, the enemy's machine-gun nests and his nearest mortars remain silent. His batteries open fire not earlier than five or ten minutes after the beginning of our artillery action. If our counterbattery fires are conducted energetically and accurately, the enemy replies much later. Since his ability to observe is very limited, his artillery in most cases lays only a standing barrage over our trenches or ahead of them. If our forward elements leave their positions, of departure at the proper time, enemy shells will in most cases burst behind the advancing waves, with only a few shells exploding among the attackers. But should the infantry be late, it is likely to meet a dense curtain of fire.

Sometimes the infantry launches the assault right from its positions of departure. It moves forward without halting anywhere and fires as it advances, using all types of infantry weapons. In view of the long distances covered by the attackers, they reach enemy trenches rather fatigued. To avoid this, it is advisable to halt the movement within the assaulting distance. Each man takes a little rest, reloads his weapon, and gets better instructions as to the mission. From this position the men can fire several times in the direction of the enemy. These fires not only affect the enemy but serve as a psychological preparation for the impending assault.

If planned for, this delay on the assault line [Russian term meaning line of departure for assault] is an important link in the organization of cooperation, for it enables the command better to coordinate the blow of the infantry and tanks with the end of the artillery preparation and with the transfer of fire into the depth of the enemy position.

The pause on the assault line should not be long; an excessive delay will result in unjustified losses, for the men will not have enough time to dig in. As experience has shown, the infantry should reach this line ten or twelve minutes before the time scheduled for the assault. If the terrain feature

chosen for the assault line runs along an open slope of a ridge or along a swamp, the time the infantry is to remain here should be decreased. Under all circumstances, the beginning of the assault must coincide with the end of the artillery preparation.

The assault itself should last five minutes at most. The importance of the impetuosity of the assault can be judged from the following example. A company launched the assault following a two-hour artillery preparation and in three and a half minutes reached the first enemy trench. The enemy was caught unprepared, many Germans were killed, and the next trench, too, was overrun without halting. The adjacent company, however, was delayed somewhat and took two more minutes to reach the assault line, but these two minutes were sufficient for the enemy to organize a strong fire resistance in the first trench. The company was pinned to the ground.

In this case the enemy infantry was ready to repulse our assault within four or five minutes after the end of the artillery preparation. Ordinarily this happens much later—the enemy recovers the ability to fire only within ten to twelve minutes. But even these figures confirm the fact that speed of assault, or its tempo, is of decisive importance.

To insure the effectiveness of the cooperation between the artillery and the infantry, the infantry must leave its line of departure at a certain determined time, reach the assault line at a certain time, get prepared for further action on this line, and launch the assault precisely at the time when our artillery transfers its fire into the depth of the enemy position. This means that the infantry should be allowed a definite amount of time for the above actions.

This time depends, first of all, upon the distance from the line of departure to the assault line. This distance varies, but seldom exceeds, in practice, 600 or 700 meters. Not infrequently, our trenches are so close to the enemy (100 meters or closer) that the line of departure coincides with the assault line.

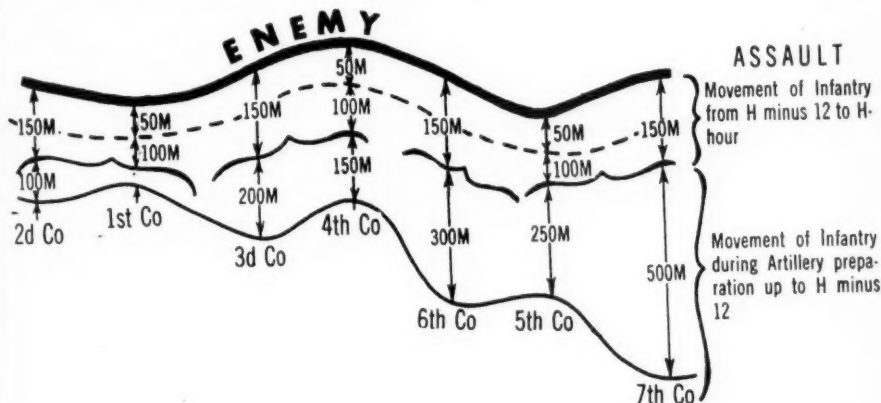
Experience shows that it takes about fifteen or sixteen minutes to cover 200 meters. Thus, if the distance between the line of departure

and the assault line is 500 meters, the time required to cover this distance is thirty-five to forty minutes. Add to it the ten or twelve minutes spent on the assault line in preparation for the next move and you will have a total of from forty-five to fifty-five minutes. Consequently, the infantry has to leave the line of departure fifty-five minutes before the time scheduled for the assault, or at H minus 55.

The overlay reproduced in the sketch clearly shows that this time should be computed

foregoing example, the artillery preparation cannot possibly last less than fifty-five minutes. Otherwise the infantry will not have enough time to get ready for the assault.

The selection of the assault line is also very important. The closer it is to the enemy's main line of resistance, the more advantageous it is for the employment of the element of surprise and for the effectiveness of the assault. It should be selected so that our infantry cannot be affected by the shell bursts intended for the enemy line of resistance.



separately for every company. The 2d Company, for instance, is to cover, moving by bounds, about one hundred meters, which will require about eight minutes. With the twelve minutes on the assault line and four minutes allowed to cover the assaulting distance, this company should leave its position of departure twenty-four minutes before the end of the artillery preparation, or at H minus 24.

It is obvious that the regimental commander or the battalion commander must compute very accurately beforehand a time schedule showing the time each company is to leave its position of departure. So far as the artillery is concerned, the plan for artillery preparation should be based not only on the time required to destroy and neutralize certain targets in the enemy's position but also on the time which will be needed by the infantry to reach the assault line. In the

Unfortunately, this consideration is often neglected, and many commanders do not take the terrain into account. The assault line is often designated two hundred meters or more from the objective, even when the terrain cannot be observed by the enemy and allows the attacker to approach the enemy trenches much closer. All this increases the time required for covering the assaulting distance and deprives the action of the element of surprise.

Considerable importance attaches to the problem of the coordination of the artillery fire with the movement of the infantry during the period when the former supports the attack. It should be emphasized that the artillery fire previously planned for certain enemy weapon emplacements and centers of resistance is very effective when transferred to these targets at the proper time. Some weapon

emplacements, however, may survive the artillery preparation and the artillery fires of the next phase, and may become serious obstacles for the advancing infantry. These emplacements should be suppressed either by direct or indirect fires of our artillery.

The initiative on the part of the artillery officers plays here an important part. They must carefully follow the course of the battle, maintain close contact with the commander of the unit they support, and know at all times his plans and intentions. Both the infantry battalion commander and the artillery battalion commander should occupy the same observation post. But this is not enough, for one may often observe that, although the artillery commander uses the trench occupied by the infantry commander, no actual contact exists between the two officers.

Thus, the artillery commander may fire on targets having very little to do with the mission of the infantry or neglect to request the battalion commander to inform him of the company commanders' reports. The infantry battalion commander, on the other hand, does not often try to figure out what impedes the movement of his companies; he fails to assign any new missions to the artillery, to request artillery fire, or to help the artillery officer to get a true picture of the situation.

During the period when the artillery supports the assault and the action in the depth of the enemy position, the technique of target reporting should be as well worked out as possible. This reporting is greatly facilitated

when the terrain is skilfully coded, that is, when all terrain features are given code names and when a sufficient number of good reference points is selected. Needless to say, all commanders of infantry and artillery units should know all these code names and reference points. Unfortunately, this is not always the case.

Many young officers think that giving code names to various objects and using them in the heat of battle is not practicable. They are wrong, of course. It is well known that not all terrain features shown on our maps have names. You will find on any map a multitude of nameless groves, heights, etc. To give all these nameless objects names means to code the terrain.

There is nothing new in this. During World War I, Russian division headquarters issued "orientation plans" which complemented the maps with numerous nameless terrain features. Any simple and reliable method of "coding" the terrain deserves consideration in the interests of better target reporting.

Let us repeat in conclusion that under all circumstances and during all periods of the offensive the infantry must take advantage of artillery fires. This means avoiding even the slightest pause between the end of the artillery preparation and the beginning of the assault; it means the execution of the assault at the time when the fire weapons of the enemy are recovering from the effect of our fires.

Airships

Digested at the Command and General Staff School from an article
by Flight Lieutenant Lord Ventry in *The Aeroplane*
(Great Britain) 23 February 1945.

At the beginning of the present war, the U.S. Naval Airship Service had some eight non-rigid airships in commission, all based at Lakehurst, New Jersey. Now, early in 1945, there are some 150 ships and, at a conservative estimate, round about fifteen airship stations.

The airships have been used on antisub-

marine operations and air-sea and air-land rescue service and, until recently, no ship has ever been sunk when a "blimp" has been with a convoy.

Experience has shown that surface ships are peculiarly tempting to U-boat captains when they are either forming up for a convoy or dispersing, and, naturally, these operations

take place in coastal waters. As a result, the airships are in particular demand where coastal convoys and shipping are concerned. Here the value of a chain of airship stations is evident. With these in being, the airships of one station can pass a convoy over to those of the next.

In addition to the coastal convoys, the K ships of today hover around the outward and inward-bound convoys, for these ships are capable of flying at cruising speed for sixty hours or more if need be. Experience has shown, however, that these long airship flights are not of great military value, and that they should be looked upon as exceptional. Twenty hours may be taken as a more reasonable figure, for then the crew of from eight to ten can keep an efficient lookout. On the other hand, it would be a mistake not to make proper use of the airship's power of endurance; and there was another problem to solve, the natural fall in lift due to reduced density of air in hot climates. The answer to both these problems was, of course, the same, to build a larger ship, and so the fine M class came into being. These ships are of 625,000 c.f., and are the largest successful non-rigids ever constructed, and, like the K ships, are driven by two outriggered motors of quite moderate horsepower considering the size of the ships. As a larger crew, working on the watch system, is carried, the M ships, thanks to their long articulated cars, are able to give their crew reasonable comfort, with sleeping bunks, good messing arrangements, and space to stretch their legs. At the same time, the piloting and navigating portions of the car are roomy, and all this makes not only for efficiency but the possibility of very long flights, and there is none of that feeling of being overcrowded which is apt to make long hours in the air very tiring.

For training, and more restricted patrolling, the G and L class airships are available. The original G.1 was the ex-Goodyear Defender of 178,000 c.f., driven by two 165-horsepower motors which gave her a full speed of sixty-five miles per hour. G.1 was acquired by the Navy in 1937, and until the advent of the L.1 was the smallest ship at

Lakehurst. She proved very useful as a school ship, both for teaching airship piloting and for instruction in navigation and parachuting. During the war, further large G ships have been constructed for advanced training and for limited operational purposes. In addition to the G, K, and M ships, there are the L class of 123,000 c.f., which are improved editions of the famous Goodyear "blimps" *Enterprise* and *Puritan*, which although constructed in 1934, were still going strong in 1940.

The L's are school ships, and they are easy to handle and extremely maneuverable. Their peacetime handling parties only numbered some sixteen men under normal circumstances, and when making advertising and passenger flights the flying crew would consist of the pilot and his assistant, and possibly an engineer. Much mooring-out was done, thus making these airships to a large extent independent of sheds, and this now applies to the K ships. As the future of airships was largely dependent on the solving of this problem, the United States, like Great Britain, have gone all out, and as a result the present-day non-rigids have successfully survived many a gale while moored to a mast.

The chief dangers to airships are severe icing, and, above all, electric storms and line squalls. Visibility hardly matters, for the airships have often left under "zero" conditions. The main risk of flying through a patch of thundery weather is the risk of being caught in the powerful vertical currents. If such an area has to be flown through, the airships are kept as low as possible, for the vertical air currents naturally damp out near the ground.

So far as wind is concerned, its strength and direction in relation to the ship's course would, of course, affect the range of an airship, but provided that ground handling is possible, there is no particular risk in flying in strong winds so long as there is plenty of fuel in the tanks.

United States airship crews have developed a most successful method of refueling from a passing surface ship. A suitable craft having been contacted, the airship is brought close

up and lowers two small balloons, one inflated by air, the other empty, connected by a length of rope. The air-inflated balloon floats on the water and the steamer or warship pulls them on board, filling the empty one with fuel. Then they are carefully lowered back into the sea and a grapnel is dropped on a line from the airship, which is hooked on to the connecting line, and so the two balloons are pulled up into the car and the petrol is soon poured into the tanks. Thus for refueling while in flight. One way of economizing in fuel and gas is to keep the ship near to equilibrium during a flight. Barometric and temperature changes both affect the lift, and as the ship flies on she becomes lighter all the time owing to the consumption of fuel.

There are times when an airship has to remain hovering over one spot for many hours on end. Then a sea anchor or drogue is lowered and, provided that temperature conditions are not too uneven, the airship can do this and without using her motors, unless to stop a drift. Under reasonable conditions, crews can be changed, food picked up, and even fishing has been indulged in. The general handiness of these airships has made it possible to use them on air-sea and air-land rescue service. Although, of course, they are slower in reaching their "targets," they make up for this by being able to remain in their vicinity and, of course, a small object like a raft is more likely to be picked up by the crew of an airship than by that of a heavier-than-air craft, for the latter's very speed is against it.

Although the modern U.S. airship often takes off heavy like an airplane with the use of a runway, and can land on its wheel and taxi up to its handling party, it can also be put down in very restricted areas and land in marshes, from which no airplane could ever take off. Because of these valuable properties, the K ships have several times rescued stranded airplane crews from the jungles of South America, including men of the Royal Canadian Air Force. Thanks, then, to those who built and flew the non-rigids in peacetime and their fine record on active service, these airships have once again proved their worth.

The airship has a potential endurance

greater than a corresponding heavier-than-air craft. It affords much greater comfort to its crew, and the latter have far better facilities for detailed reconnaissance than the crew of any airplane or flying-boat. The one drawback is their vulnerability, and so they cannot be employed without strong escort within range of likely air attack.

There are, however, great areas where no enemy aircraft can be found, but where enemy submarines are by no means inactive, and it is against these that the non-rigids should be employed, for when hunting these slow-moving craft, which can now spend long periods in the twilight of the ocean depths, speed is a hindrance, and the ability to fly slowly and to hover is everything. Indeed, now that the U-boats are capable of remaining under the water for longer periods than ever before, the importance of the airship will increase.

A submarine may remain for days in the same locality, or spend long periods creeping along below the waves. An airplane detailed to hunt such a U-boat must have something of these same qualities, and the airship alone possesses them. No other form of aircraft combines all the qualities needed, for the airship, too, can hover over an area for long periods, or can creep along with only just enough speed on her to keep steerage way.

That the heavier-than-air craft should be employed independently where their great speed can be used with advantage in sweeping large areas ahead, for example, of a convoy is obvious. The airship, on the other hand, is better employed in acting as a watchdog over the convoy itself, for this would normally never steam faster than fifteen knots, and the normal cruising speed of some forty knots of the airship leaves plenty in hand for adverse winds, and so on. A convoy so guarded is a difficult nut to crack for the wiliest of U-boat commanders, and if we willfully neglect to use the convoy airship, we are merely making life a little more pleasant for these very clever and potentially dangerous enemies. The U-boat is still our greatest menace, a fact which we forget at our peril, and the non-rigid airship is one of the best weapons with which to counter it.

Montgomery's Tactics

Digested at the Command and General Staff School from an article
by Brigadier General H. S. Sewell in *Britain* (British
Information Services) April 1945.

FIELD Marshal Montgomery, in the two and a half years since he was posted to the command of an army, has earned a reputation for planning and leadership.

As commander in the battle which was fought in February between the Maas and the Rhine, Montgomery had under his direction the First Canadian, Second British, and Ninth American Armies, and as leader of this international force his technique in battle has again been of interest and concern to many people outside his own country in just the same way it was during the critical days of the battle of Normandy.

Montgomery's plans for battle have always been based on simplicity and he has invariably followed the important principle of war, the maintenance of the objective—or to put it simply, he has kept his eye on the main object. He tells his men what he intends to do, as he considers that the advantage gained by the troops knowing his general intentions far outweighs any consideration of security.

It would be difficult to find better examples of "the maintenance of the objective" than the operations in Normandy and the battle for the Rhineland. In Normandy, Montgomery intended from the start to make the German commander—Rommel, Model, and Rundstedt in turn—break his head against the British and Canadian forces on the left above Caen, so as to give the Americans on the right a better chance of making a clean breakthrough near Avranches.

The same thing has happened in the Rhineland. Montgomery's first move was to strengthen the Canadian First Army by the transfer to it of an army corps from the British Second Army. This reinforcement was in addition to the British divisions already serving with the Canadian army, and it gave General Crerar as strong a force as could be employed on the narrow front between the Maas and the Rhine. The at-

tack, during its early stages, was pressed by three British and one Canadian division, and the danger which it presented to the German army defending the approaches to the Ruhr was too great to be ignored. The point of attack was also on the shortest road into Germany and the one most lacking in natural defenses, and Rundstedt was forced to bring in his reserves to meet it. The two divisions originally holding this sector were progressively reinforced till elements of no less than eleven German divisions, including some of the best panzer and parachute divisions, were eventually drawn into the battle against Crerar's army. There was no division of poor quality engaged in this battle.

By the time that all was ready for the breakthrough on the Roer, there were nearly three times as many German battalions fighting between the Maas and Rhine as were engaging the Americans on the Roer from Roermond to Düren. The Roer was still in flood and Rundstedt obviously did not expect that a crossing of the river would be possible for some time. The American assault, by moonlight across the broad water barrier, was perfectly executed by the Ninth Army, with the First Army covering its right and protecting in on that side by a drive directly towards Cologne.

Offensive operations by the American Third Army south of Cologne also contributed to the success of the northern army group by confusing the enemy and pinning down his reserves. The action of the First and Third Armies, under General Bradley's command, left the Ninth Army free to exploit the situation, which had been created by Montgomery, in the north. Covered by the action of these armies, General Simpson had nothing to fear from the enemy on his flank when he raced north through an area that had, to a great extent, been drained of troops by the battle that for two weeks had been raging on the Canadian army's front. Each move in the

battle for the Rhineland was made as planned and was perfectly timed. Throughout the operation, Montgomery kept his eye on the main object.

The two factors which Montgomery rates as having the most important bearing on war in general and on battle in particular are (1) use of air power and (2) administration. The air battle is a necessary preliminary to the land battle, and with air supremacy won, Montgomery's method for the employment of the air force operating with his armies has been to concentrate its full force on selected targets. The flexibility of air power is its greatest asset and enables it to be switched quickly from one objective to another.

Montgomery's use of artillery, which has played such an important part in all his battles, is similar to his employment of the tactical air arm. He has evolved an effective system of training and communications in his

armies by which a great concentration of fire power from widely dispersed batteries can be directed, at almost a moment's notice, on to any selected point.

The importance of administration is fully appreciated by Montgomery. Without the preparation of administrative services on an adequate scale, an army is likely to fail in its tactical objective, and may find itself in a very precarious condition. Montgomery's maxim as regards this service is that a commander must insure that his administrative arrangements in rear are commensurate with what he intends to do in front.

Morale is the greatest factor of all in war. Without a high morale nothing can be achieved. Montgomery's advice to his leaders, when the issue of a battle may hang in the balance, is to radiate confidence in the plan and in the operations, even if inwardly they may feel not too certain of the outcome.

Red Star

The following account of Red Star (Krasnaia Zvezda), the daily newspaper of the Red Army, is taken from an Associated Press dispatch from Moscow. The military articles that appear in Red Star are among the best to be found in military literature today. For many years the Military Review has been publishing digests of these articles, translated at the Command and General Staff School, in its "Foreign Military Digests" section.—THE EDITOR.

MAJOR General Talensky, the man who edits *Red Star*, newspaper organ of the Russian Army, has one of the most responsible jobs in the Soviet Union, for *Red Star* is more than a newspaper. It is practically the Bible of the huge Red Army and is distributed and read daily from the border of Greece to the Pacific and from Amur to the Baltic.

Red Star is an officers' newspaper and is written more to instruct than to entertain. The outside pages naturally carry Marshal Stalin's orders of the day, his congratulations to commanders who have achieved the latest victories. They also display communiqués from the Soviet Information Bureau.

Special articles on military tactics are a "must" item.

In addition to technical articles, much space is given to political instruction, because the officers pass on information to their men.

Red Star carries dispatches from front-line correspondents, fifteen of whom have been killed or captured since the beginning of the war. The correspondents have access to the commanders and generals in the field and frequently the commanders themselves write for the paper.

Red Star is twenty years old.

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